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Middle school teachers' perceptions on the use of physically active learning during lessons

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Middle school teachers' perceptions on the use of physically active learning during lessons
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Children's physical activity under ten years of age is usually spontaneous and non-organized. A significant decline in activeness occurs during the second decade of a child's life which can be avoided with more organized activity. In middle school or secondary school, the time during a school day spent doing sedentary activities increases. Studies show that an increase in physical activity benefit students' physical, social and emotional wellbeing. Use of physically active learning during lessons, especially cognitively engaging activities, has been shown to benefit students learning and health.

This master's thesis focuses on the qualitatively differing aspects in middle school teachers' perceptions on the use of physically active learning during lessons and methods of its implementation. The objectives of this study were to provide reflections on the phenomenon and practical methods for individual teachers, teacher education programs and the wider public. This thesis is a qualitative study using a phenomenography approach to systematically analyze the data. The research data collection included 6 middle school teacher participants from Finland, Lithuania and Denmark, who took part in focus group discussions.

The research results conveyed that teachers perceived the use of physically active learning during lessons to be beneficial for students as well as challenging to implement. The benefits for students perceived included improvement in memory, motivation, concentration and wellbeing during lessons. The challenges perceived with implementation included struggling with set school structure and culture, taxing nature on teachers, and the concern of student's adaptability. The participants conceptualized three different ways of implementing physically active learning during lessons including: non-cognitively engaging physically active breaks, physically active breaks reviewing curriculum learning goals and the integration of physical activity into a lesson. Participants did not address social and emotional benefits and cognitively engaging activities that introduced new content. This research brings new insights from teachers for further research and developing physically active learning methods.

Keywords: physical activity, physically active learning, teachers' perceptions, student wellbeing

Contents

1 Introduction

The Global advocacy for physical activity and the International society for physical activity and health (2012) consider schools as one of the best opportunities for promoting physical activity (Global Advocacy for Physical Activity & Advocacy Council of the International Society for Physical Activity and Health, 2012). The level of physical activity participation declines from childhood to adolescence and the difference is seen in the change of physical activity from students in primary school to students in middle school (Troiano et al., 2008). Therefore, the emphasis on including more physical activity during the school day is relevant especially in middle school or secondary school (Malina, Bar-Or & Bouchard, 2004, 467-468). Through a study by Rajala et al. (2016) on student physical activity during the school day, it was observed that students in primary school are more active than students in middle or secondary school. This study took place in Finland where the middle school or secondary school, includes children in grades 7 to 9 or ages 13 to 16. There are several reasons for this difference in physical activity between younger and older students. Three primary reasons for the inactiveness in older students is the lack of planned activities for older students, typically longer school days in middle school compared to primary school and the change in the type of physical activity. Children's physical activity between three to ten years of age is usually spontaneous and non-organized, while older children move more when activity is planned and organized. (Rajala et al., 2016; Malina, Bar-Or & Bouchard, 2004, 467-468.) A change in school culture and structure to support physical activity as well as staff involvement are necessary for the increase in student activeness during the school day. Lifestyle patterns of leisure activities and sport participation is adopted by children in school and by the time they are sixteen years old. During these years, they begin to form the foundation of their adult leisure lifestyle. (Bocarro et al., 2008.) Research on ways to increase physical activity during the school day have focused primarily on time outside of lessons, but since children spend more than two thirds of their time during lessons at school participating in primarily sedentary activities, (da Costa et al., 2017) the need of research focusing on physically active learning during lessons is evident.

Physically active learning during lessons is a method which requires students to use their muscles voluntarily during lessons in the learning, practicing and repetition stages of the learning process (Wijnsma 2017, 8-9). The physically active learning phenomenon based on Dewey's (1897) theory that learning proceeds from activity, as well as Vygotsky's (1978) theory of so-

cially constructed learning occurring through interaction and collaboration, deepening an individual's learning and understanding. The use of the term, physically active learning during lessons, for this thesis is to specify that this method is used during a planned lesson rather than the physical activity that occurs outside of a lesson. Physically active learning during lessons can be implemented in three forms including; active breaks, curriculum focused active breaks and physically active learning lessons (Watson et al., 2017).

Physical activity during the school day has multiple areas of benefits for academically related outcomes such as on-task classroom behavior, academic achievement, cognitive function (Watson et al., 2017). Classroom behavior refers to time spent on-task in relation to the teacher's instructions and expectations (Mahar, 2011; Mahar et al., 2006; Bailey & DiPerna, 2015). In a study on the causes of classroom environment disruptions by Vuorinen (2005), a strict prohibition of physical activity in the classroom is one of the reasons for disturbances in the classroom (Vuorinen, 2005, 181). Focused attention is an important skill for learning (Steinmayr et al., 2010) and can be a long-term predictor for children's academic achievement (Steele et al., 2012). Regular and varied participation in physical activity supports the development of a healthy physical body and brain structure, use of cognitive function, supporting mental health and even the development of social skills (WHO 2011; Kantomaa, Syväoja, & Tammel, 2013).

In education, the focus must be on what is best for the child or student, or a child-centered perspective (Dewey, 1897). Often the focus of the studies which are qualitative, such as this thesis, bring forward the perceptions and experiences a teacher has of the phenomenon studied. However, the purpose of this thesis is to analyze the various perceptions in order to further development the methods of physically active learning by exploring and collecting data on teachers' perceptions on the use of physically active learning during lessons. Thus, potentially supporting teacher's awareness of the phenomenon and addressing the current perceptions on the use of physically active learning. The findings of this study can aid their mission to reach all children with the most suitable method and approach possible.

The structure of this thesis begins with the theoretical framework of physical activity and physically active learning during lessons in the form of a literature review. The research design chapter will layout the way the phonomyography research approach is applied. Using this research approach that analyzes the various perceptions teacher have on the use of the phenomenon, is the structure in with the following research questions will be explored.

How do middle school teachers perceive the use of physically active learning during lessons?

How do middle school teachers implement physically active learning during lessons?

The data was collected through focus group discussions of middle school teachers. After the transcription, analyzation provides an opportunity to categorize and describe that various perceptions on the phenomenon the participating teachers share. The presentation of results is followed by a discussion on how the results relate to the theoretical framework and what the perceptions can be areas for further research. The focus of this study is on the perceptions of middle or secondary school teachers, but for the purpose of clarity, the term used for this thesis will be middle school.

Although there has been an increase in the amount of research on physical activity in relation to learning and the brain, there does not seem to be much research on teachers' perceptions of physically active learning in the classroom. The study of Dyrstad and colleagues (2018), is an exception since it includes the perceptions of school leaders, teachers and children on physically active lessons, making it similar to this study's focus. Dyrstad et al. (2018) found a positive outlook by participants on the use of physically active lessons in terms of implementation, use of curriculum based activities and teacher support during the intervention. The main challenges were lack of knowledge, clarity of goals and time for planning. According to Riley et al. (2015), there is a lack of classroom teachers included in the development of physically active learning intervention programs which leads to an implementation that is difficult to maintain (Riley et al., 2015). The inclusion of teachers in research on the use of physically active learning during lessons and the with development of an intervention program may lead to a more sustainable and effective implementation.

2 Theoretical framework

2.1 Physical activity

Physical activity is a multidimensional concept but is understood to consist of movement produced by skeletal muscles in the body while increasing the need and use for energy (Caspersen, Powell & Christenson 1985, 126). Caspersen et al. (1985, 126) also defined the various terms used to refer to the concept of physical activity. The three terms defined were exercise, physical fitness and sports. The definition of physical activity by clarifying the various categories has been one of the most commonly accepted definitions concerning physical activity in research. Exercise is any planned, structured, repetitive physical activity that has purpose to develop or maintain one or more aspects of a sport skill or physical fitness achievement as an objective. Physical fitness is another term that refers to physical activity and is based on an individual's physical attributes that can be improved in exercise programs appropriate for the individual. Lastly, sports are physical activities that require physical motor skills used in an organized game setting. (Caspersen, Powell & Christenson 1985, 126-131.)

Most of the basic motor skills used in physical activity are developed during infancy and early childhood while more advanced motor skill development continues during childhood and throughout adult years (Malina, Bar-Or & Bouchard 2004, 195). Jaakkola (2010) defines motor skills as the ability to voluntarily move the body and/or body parts to do what was intended (Jaakkola 2010, 45-46). Malina, Bar-Or and Bouchard (2004) further define motor development as a continuous process that occurs in the physical and social context in which the child is reared. Motor activity may be described as fine or gross motor activities. Fine motor activities require precision and dexterity, while gross motor activities involve major parts of the body or the body as a whole. For example, a fine motor activity requires hand-eye coordination, while a gross motor activity can occur while running, jumping or throwing. The basic motor skills developed at 3-7 years of age include balancing skills, movement skills, and skills of handling equipment. (Malina, Bar-Or & Bouchard 2004, 196.)

According to Malina, Bar-Or and Bouchard (2004) children's physical activity between three to ten years of age is commonly spontaneous and non-organized. A decline of physical activeness occurs in the second decade of a child's life, which is the age the objective of this thesis study is focused on. If the amount of activity for an individual child under ten years of age already is close to inactivity, there is reason for more alarming concern with decrease in activity

during the middle school years. (Malina, Bar-Or & Bouchard, 2004, 467-468.) The concept of physical inactivity is described by National Institutes of Health (1995) as a level of activity less than needed to maintain good health (National Institutes of Health, 1995, 6). Even with an increase of urbanization and electronics based lifestyles that may have a negative effect on children's natural drive for physical activity, Pate (1997) argues that most children are active enough to maintain good health (Pate 1997, 210-214). This case presented by Pate (1997) was presented over twenty years ago and there has been a big change in lifestyle as well as an increase in the percentage of overweight children. A more recent study done considering the global shift towards inactivity, by Ng and Papkin (2012), stated that the percentage of overweight children has risen to alarming levels in recent years (Ng and Popkin, 2012). Best (2010) relates that obesity in children is related to poor academic achievement and to sedentary behavior (Best 2010, 345). Even without a status of obesity, the low physical activity among school children is correlated with low academic performance (Castelli et al., 2007; Buck et al., 2008; Chomitz et al., 2009).

2.1.1 Factors affecting physical activity

Physically activeness of a child is influenced by various factors, and based on the literature that is available, only a few factors have been thoroughly studied. Three of the central factors influencing a child's physical activity are the individual's biological makeup, social environment and physical environment. One factor that is significantly lacking in the review of physical activity are changes related to growth and maturity which happen especially during the second decade of a child's life. (Malina, Bar-Or & Bouchard 2004, 471-474.)

The biological factors on physical activity include the sex of the child, health status and sexual maturity and according to Eaton and Yu, (1988) evidence indicated that males have greater levels of energy expenditure than females (Eaton & Yu 1988, 1005). The health status influences the physical activity levels negatively if the child has a chronic disease or a mental or physical disability. The sexual maturing of a female also often lowers the amount of physical activity. (Malina, Bar-Or & Bouchard 2004, 472)

Social factors including parental activeness, influence of peers, family socio-economic standard and societal factors all are significant in the activeness of the child. If the parents of a child are both active, the child will be more active than if the parents were inactive. (Moore et al., 1991, 63.) Later in life, the child is more significantly influenced by their peers in terms of activeness,

but the socio-economic standard of the family will continue to affect physical activeness by amount of resources to fund access to programs or facilities in developed countries (Malina, Bar-Or & Bouchard, 2004, 473).

The physical environment of a child's home, as to whether activity facilities are nearby, may influence the amount of physical activity that is typical for a child (Sallis et al., 1990, 179-182). In areas around the world that experience seasonal changes, weather often influences the amount of physical activity. Studies show that in mild to cold climatic areas, but not necessarily in warmer regions, physical activity increases in the summer months. (Ross et al., 1985, 40-43; Telama et al., 1985, 173.) This also correlates with the studies that show that children are more active when time is spent outdoors (Klesges et al., 1990, 440). These studies are particularly relevant since the participants in this study are from Finland, Denmark and Lithuania, which are considered cold climatic areas.

2.1.2 Health benefits of physical activity

With the studies in the past ten years conveying a decline in the amount of physically activity in children and adults alike, scientists have begun to study the relationship between physical activity and health related quality of life during the adolescent years. Results of a pediatric study found that over a long term, regular outdoor physical activity was associated with higher health-related quality of life adolescents. On the other hand, youth with lower quality of life scores, were among those observed to having the most screen-viewing activity time. (Gopinath et al., 2012, 168.) The nature of the study by Gopinath et al. (2012), which took place over 5 years, supports the concept that promoting more physical activity and less screen-viewing time may benefit not only weight and fitness, but also improve wellbeing during adolescence years and into adulthood.

Improving wellbeing requires an individualistic approach that reaches all aspects of health. Regular and individually appropriate physical activity supports the development of a healthy cardiovascular system, neuromuscular awareness, healthy musculoskeletal tissues and it also helps maintain a healthy body weight (WHO 2011, 1). Also, physical activity has been positively associated with psychological benefits in young people. These benefits include; improving control over symptoms of anxiety and depression, providing opportunities for self-expression, building self-confidence, social interaction as well as integration. Physical activity opportunities may also lead to the development of social skills. (WHO 2011, 1.)

Due to the nature and purpose of this thesis, only physical activity in terms of individual health benefits is addressed, but in practice, individual wellbeing requires effort in all spheres of life. It is important to realize in terms of physical activity health benefits, exercise and physical movement is always beneficial even if weight loss does not occur (Nordic Council of Ministers 2014, 203). However, there is concern that intensive training for sport during childhood and adolescence can have a negative influence on growth, maturity and the health of an individual (Malina, Bar-Or & Bouchard 2004, 480). The participation in various styles of physical exercise may potentially be more beneficial for one's overall wellbeing if it is regular and consistent, than if it is more demanding and sporadic (Nordic Council of Minister 2014, 203-205).

Studies performed in Finland, such as Jaakkola (2013b) and Kantomaa, Syväoja and Tammel (2013) explored the anatomical and physiological effects of exercise and found that they extend not only to the physical body, but also to the brain and its function. They continue that exercise improves brain circulation and oxygen supply, and everyday exercise generates new neurons and this effect is particularly evident in the hippocampus, which is the center of learning and remembering. Exercise also affects the connections of brain cells, brain structures and other existing nerve networks. These connections also increase human learning potential as nerve networks develop attention and concentration and improve information processing and memory functions which may lead to a student's success in various cognitive tasks. (Jaakkola, 2013b; Kantomaa, Syväoja, & Tammel, 2013.)

Benefits of physical activity are proven to be essential in development of the brain, physical aspects of health, and provide more mental stability for basic aspects of life rhythm such as improving school attendance. School attendance may be supported by the physical activity benefits of improving quality of sleep and helping make falling asleep easier. Benefits in relation to wellbeing include improvement of mood, self-esteem and creating opportunities for new social relationships. The extent of benefits addressed conveys the importance for maintaining and increasing physical activity participation for all. (Terve koululainen, 2013.)

2.2 Physically active learning during lessons

Research on the topic of physically active learning during lessons has been referred to with several terms. The purpose of using the term, *physically active learning during lessons,* for this thesis is to specify that this is a method to promote learning in the formal setting of a planned lesson rather than the physically active learning that can occur informally during a break or

after school. The physically active implementation can take place inside or outside the classroom itself. Also, the term chosen for this thesis includes physically active learning breaks during the lesson as well as physically active learning methods used for the entire lesson.

Classroom-based physical activity (Watson et al., 2017) is another term used, but is restricted to the implementation of physical activity occurring within the classroom. *Physically active learning* and *acute physically active learning* (Daly-Smith et al., 2018) is a term that also does not specify if it is to be implemented for an actual lesson or if it could be informal. The term, *physically active academic lessons*, is described as a teaching method combining physical activity with academic content and is use for the whole duration of the lesson (Dyrstad et al., 2018), while this thesis also includes physically active learning breaks during lessons. In a Mavilidi et al. (2018) study, the term, *school-based physical activity,* is also referred to when physical activity takes place during a lesson, but not during breaks, although the term does not specify this (Mavilidi et al., 2018). In a more recent study, Mavilidi and colleagues (2019) continued to refer to physically active learning as *integrating physical activity into the curriculum*, when they used a method that required thinking while moving for the entire lesson (Mavilidi et al., 2019). The concept has been also referred to as *classroom physical activity breaks* or *active learning* (Carlson et al., 2017). In the study by Carlson et al. there were also active breaks that occurred outside of the classroom, but this term does not refer to the activities that are used for the duration of an entire lesson. The use of the term *physical activity school intervention* referred specifically to a Danish national classroom-based health programme called Active Around Denmark (Guldager et al., 2018). Lastly the term, *motor-enriched learning activities* focused on gross and fine motor implementation, which was used for the entire duration of the lesson (Beck et al., 2016). This term refers to both gross and fine motor use for the entire lesson, while the focus of this thesis is on primarily the gross motor use and includes breaks as well as the methods used for the entire lesson.

2.2.1 Theoretical foundations of physically active learning

Addressing the concerning amount of time students are sitting down in the classroom, Wijnsma (2017) uses a combination of physically active tasks with the learning content creating a possibility to engage the students and bring variety to the lessons. In her research, she also uses physical activity during the learning, practice and repetition stages of the learning process in her research. The physical activity incorporated in a lesson allows physically active learning to

occur, requiring students to use their skeletal muscles voluntarily. (Wijnsma 2017, 8-9) Physically active learning during lessons, which is the focus of this thesis, is carried out during lesson time and can take place inside or outside the classroom itself. (Watson et al., 2017)

The idea of physically active learning is anchored in Dewey's theories of active learning and learning through experience. Dewey's research (1897) worked towards changing the perspective on learning from receiving knowledge passively from a teacher to the understanding that learning proceeds from activity. (Dewey 1897, 77-80) One variation of active learning is in the form of physically active learning during lessons, which facilitates body movement when teaching the core subjects in school (Grieco, Jowers, & Bartholomew 2009, 1921). In the implementation of physically active learning, the type of activity and physical movement used is crucial to the success of facilitating a quality learning experience. According to Dewey (1938), not all activities and experiences are equally educational, and the benefit varies between learners. (Dewey 1938, 78.)

According to Bransford, Brown and Cocking (2003), physically active learning or physical activity during lessons increases social interaction and therefore is tied to Vygotsky's notion of socially constructed learning. Socially constructed learning defined by Vygotsky, focuses on the interaction and collaboration between students engaging the learners for higher academic performance. (Bransford, Brown & Cocking, 2003) Edwards (2015) addresses constructivist learning and assumes that the concept to be learned should follow the action rather than preceding it. Physically active learning takes this understanding into practice by allowing the activity lead to the concepts, which is an important aspect for a successful implementation. (Edwards 2015, 67) Vygotsky (1978) conveys that not only is social interaction crucial for knowledge understanding, but also allows students to confirm their understanding with peers, increase enthusiasm and make lessons seem less formal, which may lead students to step out of their comfort zone and deepen their understanding (Vygotsky, 1978).

The Kolb theory on experiential learning is partially based on Dewey's theories. Since Kolb's theory is based on functionality through experiences, it is therefore, similar to physically active learning. Physically active learning is also based on functionality through experiences; however, these experiences are all physically activating. Activeness and physical activity are apparent in Kolb's theory as one type of experiential learning. According to this theory, the facilitator does not only provide new concepts and experiences for the learner, but also uses the learner's previous experiences. (Kolb, 1984.) Kolb's learning theory defines four different learning styles

based on a learning cycle with four sections. (see Figure 1) Various aspects, such as educational experiences and social environment, affect a person's preferred learning style (Klob, 2000). Based on the Kolb learning style cycle, learning begins from concrete experiences. It is from this foundation that the learner can form an abstract understanding of the concept as well as a plan of action. When the plan of action is put into practice, new kind of function or action is formed along with new experiences. Through these concrete active experiences and formation of abstract understanding, changes occur to what a student might have thought previously. (Jeronen, 2009; Klob, 2000.) The learning style according Klob based on two choices on a continuum one makes (Klob, 2000; McLeod, 2017). These two choices are presented on an axis, found in Figure 1, as the processing and perception continuum.

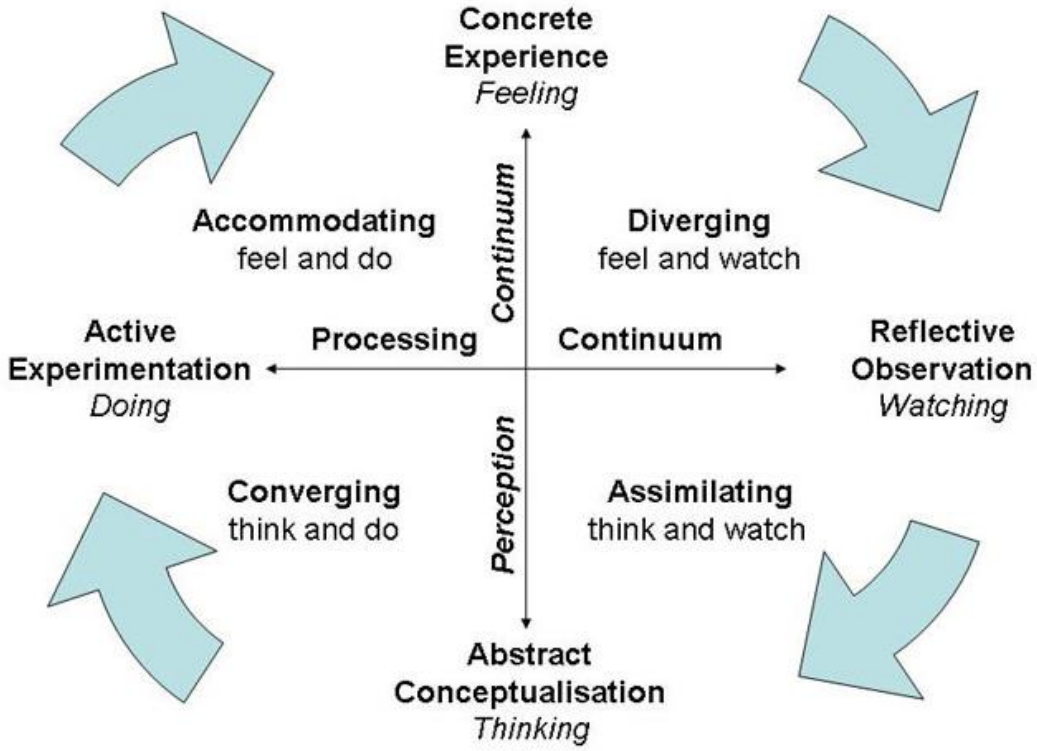

Figure 1: Kolb's learning styles (McLeod, 2017)

The processing continuum is based on how one approaches a task, and the perception continuum is based on how one feels about a task or one's emotional response (Kolb, 2000, 5; McLeod, 2017). Although physically active learning is not based on the concept of learning styles, physically active learning during lessons provides an opportunity for students to learn

from concrete experiences and active experimentation in various ways. Participation in physically active learning can be considered to address some of the various learning styles defined by Kolb as thinking, feeling, watching and doing.

2.2.2 Physically active learning teaching methods

To analyze the various types of classroom based physically active learning implementation methods, Watson et al. (2017) categorized them into three forms; active breaks, curriculum focused active breaks and physically active learning lessons (Watson et al., 2017). Active breaks are short bouts of physical activity implemented as a break from academic instruction (Ma, Le Mare & Gurd, 2014; Whitt-Glover, Ham & Yancy, 2011; Howie, Schatz & Pate, Katz et al., 2010; Wilson et al., 2016; Mahar et al., 2006; Donnelly & Lambourne, 2011; Kibbe et al., 2010; Grieco et al., 2016; Taylor et al., 2018; Watson et al., 2017). Curriculum focused active breaks are short breaks of physical activity that include the intended lesson curriculum content (Schmidt, Bezing & Kamer, 2016; Mahar et al., 2006; Bailey & DiPerna, 2015; Watson et al., 2017). Physically active learning lessons have physical activity integrated for the duration of the lesson on learning areas from the curriculum, other than physical education (Riley et al., 2016; Riley et al., 2015; de Greeff et al., 2016, Donnelly et al., 2009; Mullender-Wijnsma et al., 2016; Mullender-Wijnsma et al., 2015; Watson et al., 2017).

Active breaks and physically active learning lessons can be implemented with or without cognitive engagement. The curriculum based physically active breaks are always cognitively engaging due to the connection the curriculum and the goal of learning that is addressed through this implementation method. Curriculum based physically active learning is often implemented to reinforce previously taught lesson and curriculum content. (Mahar et al., 2006; Bailey & DiPerna, 2015.) On the other hand, physically active learning lessons is often used to familiarize and teach new lesson content (Riley et al., 2016; Riley et al., 2015; de Greeff et al., 2016; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Mullender-Wijnsma et al., 2016).

Importance of differentiating between cognitive engagement and non-cognitive engagement in physically active learning implementation methods is derived from studies that have compared the methods according to cognitive engagement and found a difference in academic outcomes. (Watson et al., 2017.) For example, in a study by Schmidt, Bezing and Kamer (2016), the comparison of cognitively engaging and non-cognitively engaging physically active breaks found that only the group with cognitively engaging physically active breaks showed an impact on

cognitive function (Schmidt, Bezing & Kamer, 2016). The following figure by Mavilidi (2018) addresses the cognitive engaging aspect on a spectrum as well as the integration level of the physical active learning task.

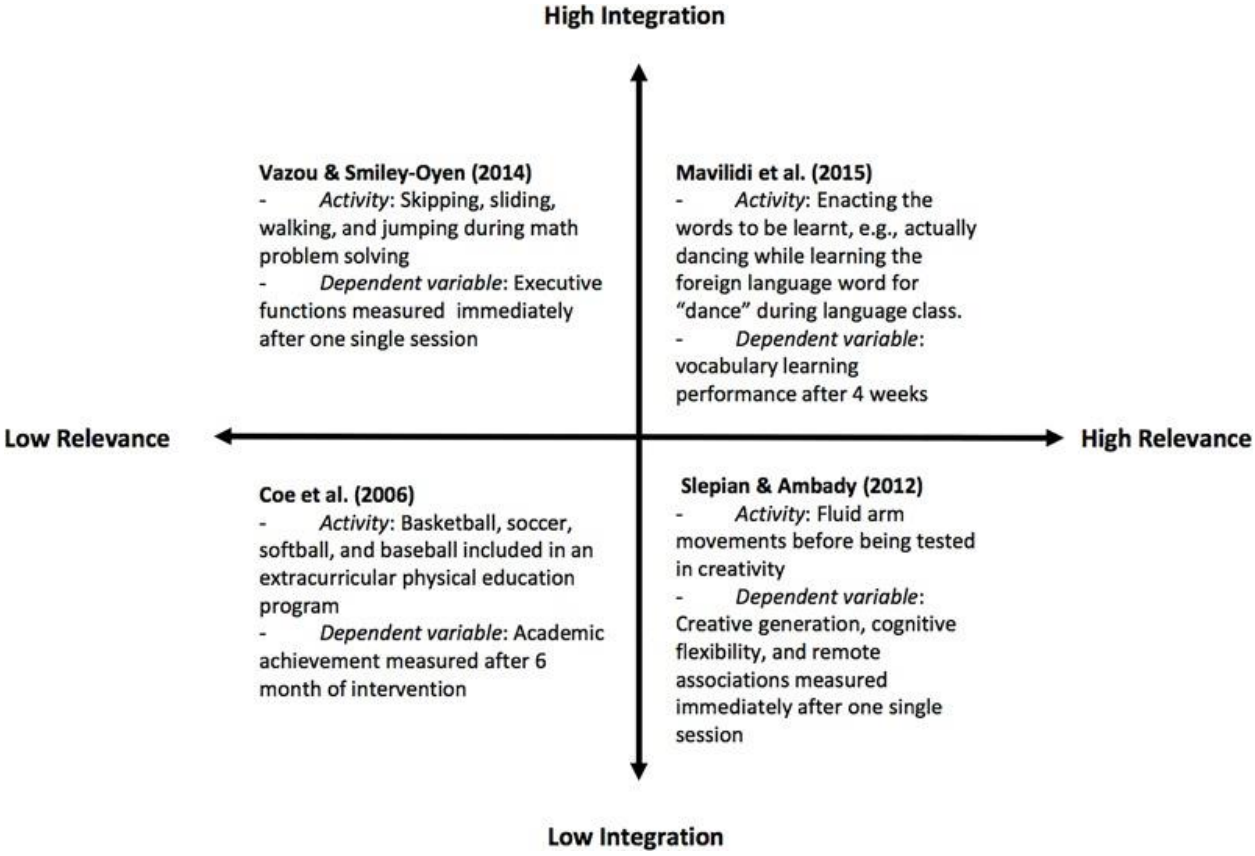

Figure 2: Cognitive-motor matrix; level of relevance and level of integration (Mavilidi et al., 2018)

A cognitive-motor matrix displaying a relative comparison of a few studies across two dimensions: the horizontal dimension refers to the level of relevance between the physical and the cognitive and learning task while the vertical dimension refers to the level of integration of the physical task with the cognitive or learning task. The cognitive motor matrix by Mavilidi (Mavilidi et al., 2018) although brief, relates to this thesis in terms of the teaching methods that will be mentioned in the next chapters. The physically active learning phenomenon and teaching methods addressed that take place during lessons can be placed on the matrix especially in the three areas; lower left, upper left and upper right. The lower right area is not as applicable due to the tendency of this area to be implemented outside of lesson time.

Lastly, the study by Dyrstad et al. (2018), focused on the perceptions of school leaders, teachers and children on the use of physically active lessons. Dyrstad et al. (2018) found that the school

leaders and students experiences and attitudes towards physically active lessons were quite positive. Teachers experiences of the implementation of physically active lessons were partially positive but also included many challenges and needs for support. Through the study with participants from five schools in Norway, the main supporting facilitators found for implementation of the physically active lessons were the ease of organizing physically active lessons, inclusion of physically active lessons into the lesson curricula, and children's positive reception of the intervention, active leadership including teacher support and teacher confidence in regard to mastering the intervention. The main challenges found were lack of knowledge and time to plan the physically active lessons and unclear expectations. Overall, the type of physically active learning method preferred by the teachers in this study were the 15 to 20 minute curriculum based breaks over the 45 minute physically active learning lessons. (Dyrstad et al., 2018.)

Active breaks

It needs to remain clear that the method of active breaks is separate from the curriculum based active breaks. Physically active break implementation methods that have been researched range from five to even twenty minutes. The length of time an active break needs to be for effectiveness was suggested to be a minimum duration of 11 minutes for obtaining cognitive benefits (Chang et al., 2012). The Liikkuva koulu program in Finland suggests many non-cognitively engaging active breaks for increasing movement during the school day. These breaks are explained to be simple to implement and can be used at any point of the school day or lesson. Some examples include; having students come to the front of the room to collect needed materials, doing several jumping jacks or just asking for a movement suggestion from the class for a short break. The cognitively engaging methods suggested by Liikkuva koulu consist of activities such as an activity involving counting to three, taking turns with a pair. The counting is done while tossing a ball, and the numbers can be replaced with actions involving the inhibition part of the executive function construct. (LIKES Research Centre, n.d.)

Instant recess is a method developed by Whitt-Glover and colleagues (2011) and consists of exercises to do as an active break during a lesson or even a workday. The exercises are as simple as neck rolls, marching in place and shoulder stretching. (Whitt-Glover, Ham & Yancy, 2011.) Ma, Le Mare and Gurd (2014) used the type of physically active breaks that were also used during lesson, but instead consisted of high intensity interval activities. The breaks used were given the name Funtervals and lasted only four minutes with the repetition of the activity in interval. The activities were whole-body movements such as squats, scissor kicks or jumping

lasting for 20 seconds of action, 10 seconds of rest. This was repeated eight times to complete the four minute active break. (Ma, Le Mare & Gurd, 2014.) Katz et al. (2010) performed a study on physically active breaks during lessons implementing Activity Bursts in the Classroom (ABC), which followed a three step method. The steps consisted of a warm-up including stretching or light aerobic activity, a core activity consisting of strength activities or aerobic activities, and lastly a cool-down similar to warm-up activities, such as a low-intensity physical activity or stretching. These active breaks included both cognitively engaging and non-cognitively engaging methods. (Katz et al., 2010.)

The Bal-A-Vis-X method that has been successful in the United States and can be used as a cognitively engaging active break or even integrate it into the learning content of a lesson to make it a curriculum based physically active break. Bal-A-Vis-X is an acronym for Balance, Auditory, Vision, eXercises. The exercises used to follow the Bal-A-Vis-X method consist of varied complexity physical activities that are deeply rooted in rhythm. Most are done with sand-filled bags or racquetballs requiring full-body use, coordination and focused attention. The purpose of the program is to enable the mind-body system to experience the natural symmetrical flow of a pendulum, which can lead the participant into a state of systemic integration, with aims for enabling one to see, hear, attend, process, produce or function at one's best. (Polonus, 2018.)

In more detail, the Bal-A-Vis-X method uses a series of approximately 300 exercises, using primarily sand-filled bags and/or racquetballs, and sometimes while standing on a balance board. Performing multiple thousands of mid-line crossings in three dimensions with a steady rhythm and pronounced auditory foundation, the program uses several senses at once. This carefully modulated system of exercises can become increasingly complex. The exercises can be and are modified for those with severe special needs. In group or school settings the program requires cooperation, promotes self-challenge, fosters peer teaching for the participants. This approach has been developed and research starting in 2001, but already has been applied in multiple settings. It is applicable in the classroom with any type of student group. Studies on the implementation of Bal-A-Vis-X have not addressed disadvantages other than the training for teachers in necessary and not always accessible. (Hubert, n.d.)

Curriculum based physically active breaks

Curriculum based learning goals can be reached through physically active breaks. Therefore, the curriculum based physically active breaks are always cognitively engaging. The type of

cognitive engagement in terms of the part of the executive function it activates is not specified in most studies. Active break methods that have been designed to reach curriculum based goals often focus on a specific concept. LIKES research center has a collection of implementation methods used in language lessons, math lessons and social studies. For example, several activities designed by LIKES Research Center were all ways to actively review the parts of speech in a language lesson. One activity consisted of defining sections of a space, indoor or outdoor, to be various parts of speech. The implementer, whether teacher or student, would say a word and the participants would move to the designated section of the space to show their answer as to what part of speech the word might be. Another activity that was designed was a variation of the activity, giving each possible answer of a part of speech a specific movement rather than a section of the room. These activities can be modified and used in any subject for a curriculum based physically active learning break. (LIKES Research Centre, n.d.)

Another method by LIKES research center, specifically for the mathematical topic of coding is a way to emphasize the logical aspect of the abstract topic of coding. For example, an activity done in pairs, where one gives their partner simple cues. The partner receiving the cues closes their eyes and listens or senses the cues. These cues can be tapping on shoulders or back, different sounds, or words, that have some meaning which requires an action of stepping forward or turning. The goal is for the student receiving cues to reach some prior agreed upon place or marker in the space and does the agreed upon action according to the coding cues given by their partner until they reach the finishing place or marker. For this curriculum based physically active break, modifications are possible to adjust for the level of understanding or interests the participants might have. (LIKES Research Centre, n.d.)

Schmidt, Benzing and Kamer (2016), implemented a cognitively engaging physically active break that could be used as a curriculum based activity if that the topic relates to order of numbers, working on symbol order or can be modified to even cover a topic such an order of operation in calculations. The method consisted of spreading the numbered mats on the floor in a random formation. The participant had to try to touch the numbers in the order asked as quickly as possible. This activity combined physical mobility and the cognitive function of recognition and inhibition to refrain from making a wrong decision. (Schmidt, Benzing and Kamer, 2016.)

Physically active learning lessons

Physically active learning lessons involve curriculum goals but differ from the curriculum based physically active breaks since this implementation method is meant to be used for the

entire duration of the lesson (Watson et al., 2017). These methods are understood to be always cognitively engaging, reviewing previously learning curriculum content (Riley et al., 2016; Riley et al., 2015; de Greeff et al., 2016; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Mullender-Wijnsma et al., 2016).

One example used by Beck and colleagues (2016), was a type of physically active learning lesson involving the use of motor enriched learning activities in the context of mathematics lessons. In the study, the comparison of cognitive benefits was between groups using gross motor skills, fine motor skills and a traditional teacher led abstract lesson. The group using gross motor skills was an example of a physically active learning lesson. For this gross motor skills implementation, the participating class adjusted the setting by arranging the desks to the sides of the room for space. The lesson proceeded with various types of dynamic and static gross motor movements including skipping, crawling, hopscotching, throwing and one-legged balance. These movements were integrated with the curriculum based lessons goals of mathematics introducing new concepts of logical math skills. The implementation lasted throughout a 60 minute lesson, allowing it to fall into the category of a physically active learning lesson. (Beck et al., 2016.)

Implementation of physically active learning lessons by Dyrstad et al. (2018) used methods that could be applied to any school subject. For language studies, an example of the integration used the basic Scrabble concept in a relay form. The children worked in groups and took turns running to collect the laminated letters that were put together to create words. In mathematics, use of a Bingo based game where groups filled in their own Bingo board. Tasks for the game were spread out in the school yard. The groups ran to the task cards and solved them in order to put a mark on their Bingo boards. Movement varied from just running to jumping, hopping on one foot or moving like different animals. The academic focus point of these physically active lessons were on repetition and memorization of previously learned knowledge. (Dyrstad et al., 2018.)

In a study applying physically active learning lessons in English lessons by Mavilidi et al. (2019), the learning content was on grammar. The methods applied required cognitive engagement, quick thinking and physical reactions. For example, one lesson consisted of a relay race with the topic of conjunctions. Students were assigned a pair and an opponent pair. Each group had a pile of bean bags in the middle of the large space, where the pairs faced each other. The bean bags had a collection of words used in conjunctions. When the teacher said a conjunction,

for example, “don’t”, one of the students in each pair had to run to collect the matching words used for the conjunction. In this example, the matching words would be “do” and “not”. (Mavilidi et al., 2019.)

2.2.3 Academic related outcomes of physically active learning during lessons

Studies on the academic related outcomes of physically active learning focus on three areas: on-task classroom behavior and student wellbeing, academic achievement and cognitive function or engagement (Watson et al., 2017). Each of these areas is addressed in the following sections, taking into consideration which type of physically active learning method was implemented in the study, and if the method used engages cognition of the participant.

On-task classroom behavior and student wellbeing

In terms of on-task classroom behavior and student wellbeing, the issues studied to influence this area of academic related outcomes include: student time on-task (Mahar, 2011; Mahar et al., 2006; Bailey & DiPerna, 2015), school satisfaction (Honkanen & Suomala 2009, 10), student self-knowledge (Laakso et al., 2007, 42) and social emotional competencies (Eldar & Ayvazo, 2009; Kokkonen & Klemola, 2013; Garn, Ware & Solmon, 2011). In support of student wellbeing with health as the focus point, research on methods of physically active learning that involve physical activity and cognitive engagement have been often focused on students with gross motor delay or diagnoses of autism and attention-deficit hyperactivity disorder (ADHD). (Polonus, 2018.) In the study performed by Katz et al. (2010) which implemented the active break ABC (Activity Bursts in the Classroom) method, they found that the use of the active break not only improved fitness of the students, but also reduced ADHD and asthma medication use. The study included a control group giving it more credibility. (Katz et al., 2010.)

The focus of many empirical studies is on student’s time spent on-task before and after a physically active learning implementation. Some of the studies implemented a curriculum based physically active break and found an improvement with on-task classroom behavior (Mahar, 2011; Mahar et al., 2006; Bailey & DiPerna, 2015). Other studies performed a physically active learning lesson which also resulted in improvement of on-task classroom behavior (Riley et al., 2016; Riley et al., 2015; Mullender-Wijnsma et al., 2015; Grieco et al., 2016). All the studies that found improvement of the on-task classroom behavior used cognitively engaging physical

activities except Ma, Le Mare and Gurd (2014), who implemented the non-cognitively engaging *Funtervals*, which were considered active breaks (Ma, Le Mare & Gurd, 2014). Implementation of non-cognitively engaging active breaks by Katz et al. (2010) also found improvement of on-task classroom behavior but ended up finding that the improvement was not sustainable and disappeared over time (Katz et al., 2010).

Increasing school satisfaction and a peaceful working environment are connected to overall classroom behavior and especially student wellbeing. Increasing student participation and activeness are key components for a positive effect on school satisfaction (Honkanen & Suomala 2009, 10). After several years of the use of the Finnish Schools on the Move program in schools, a survey was implemented to study teacher perceptions on in student activeness as well as student satisfaction. The results of this study showed that 94% of primary and middle school teachers believe that increased physical activity during the school day increases school satisfaction. In terms of a peaceful working environment, 83% of teachers believed that more physical activity in school supports a peaceful working environment. (Kämppi et al., 2017.)

When considering classroom behavior and student wellbeing, one aspect is the joy or enjoyment of the students as well as a positive perception of self. One study found that with the implementation of physically active learning breaks, the students enjoyment increased significantly. (Vazou & Smiley-Oyen, 2014.) Laakso et al. (2007) found that physical activity for the grade school aged child has a significant role in the development of their physical, mental, and social aspects of wellbeing. Through physical activity an individual learns to be aware of their own body, its action and movement, along with their ability to perform using their body. These aspects support the development of self-knowledge, perception of themselves and leads to positive changes in behavior. (Laakso et al., 2007, 42.)

Physical education lessons tend to include physically challenging tasks, various interactive situations and changing rules that need to be followed. These characteristics of physical education makes it a subject where peer relations and emotional skills can be practiced in a concrete and visible way, (Eldar & Ayvazo, 2009; Kokkonen & Klemola, 2013, 216-217) interactions between students occur more frequently and naturally, (Garn, Ware & Solmon, 2011) and student centered teaching methods are emphasized (Barr & Higgins-D´Alessandro 2009). Applying physical activity in other lessons besides physical education allows for these traits to be benefited from throughout the school day.

The moral issues and challenges that arise during a physical education lesson must be solved immediately and discussed following any incident. For example, if there is a disagreement during a team playing a game between two players, the issue must be resolved for the lesson to continue. On the other hand, an issue in a different lesson might be more abstract. (Barr & Higgins-D´Alessandro 2009.) Therefore, when physically active learning methods are implemented in other lessons during the school day, I suggest that similarly, relationship and emotional skills can be practiced and addressed in these physically active lessons as well in a more concrete way. The interactions that occur through a physical activity are usually playful, creating a learning environment that is often experienced as motivational and enjoyable (Eldar & Ayvazo, 2009). Applying physically active learning methods where students communicate within a group has been shown to increase the responsibility students take to continue developing their work and skills (Vuorinen, 2005).

For social and emotional skills to be addressed, taught and developed through teaching, the teacher implementing must have social and emotional competency knowledge and skills (Bailey, 2006). These social and emotional competency skills can be divided into a few categories. These categories suggested by Ferry, McCaughtry and Kulinna (2011) include: the teachers interaction relation with students, knowledge of students' personality traits, understanding of student peer relations and an effort to understand the student's socio-cultural environment and its impact on the child (Ferry, McCaughtry & Kulinna, 2011).

One program implemented in Norway, The Active Smarter Kids, included; 30 minutes of physically active learning a week in Norwegian, 30 minutes a week in Math and 30 minutes a week in English lessons, 5 minutes of physical activity breaks a day as well as 10 minutes a day of physical active homework. The implementation by the teachers were supported by teacher training and an online idea bank and space to ask questions concerning the program. (Resaland et al., 2016.)

The Active Smarter Kids results showed little to no significant effect on health related quality of life (HRQoL). This multidimensional construct addresses physical, emotional, mental, social and behavioral aspects of wellbeing and functioning. Therefore, all the areas addressed in terms of HRQoL relate to on-task classroom behavior and student wellbeing. The researchers suggested that teachers and students might need more time to master the practice of physically active learning methods (Resaland et al., 2018) even if the study took place over 7 months. Also, maybe the teachers need more training to develop varied practices that can be applied

with more pedagogical and learning related connection. On the other hand, Resaland and colleagues (2016) suggest that combining physical activity and learning may be a potential tool for better learning in children with weaker academic performance. (Resaland et al., 2016.) These studies differ from many due to the focus of HRQoL rather than just academic related results. I would suggest further research to take the differentiation between the type of cognitive engagement the physically active learning lesson focuses on and its relation to the lesson content. Also, the further studies could include clarification on whether the activities or active breaks require cognitive engagement at all. Although this study resulted in little to no significant effect on health related quality of life, other studies have proven various benefits in terms of on-task classroom behavior and student wellbeing.

Cognitive function

In terms of the academic related outcome of improved cognitive function or cognitive engagement, the executive function construct must be defined. The executive function includes most of the aspects addressed by studies that refer to selective attention, cognitive function and memory. Understanding the executive function construct can be misleading if the various theoretical framework models that researchers use, are not understood. Zhou, Chen and Main (2012) categorized the theoretical framework models into three types; executive function as a unitary construct, executive function as a unitary construct with dissociable components and executive function as multiple separate components (Zhou, Chen & Main 2012, 113).

For this thesis, I will focus on executive function as multiple separate components, since this characterization is applicable for school aged children (Best, Miller & Jones 2009, 2). The three components can be defined as working memory, cognitive flexibility or task shifting and inhibition, inhibitory control or selective attention. Working memory is the function of retaining information mentally and working with it. The process of using working memory can include updating thinking, planning, making connections between ideas and facts or mentally doing a mathematical calculation. Cognitive flexibility or task shifting consists of the ability to adjust oneself to changed expectations or priorities and deal with or take advantage of sudden unexpected problems or opportunities. Inhibition, inhibitory control or selective attention, which is used to think before acting, resisting temptations or distractions, staying focused or selective attention. (Diamond, 2013; Davidson et al., 2006.) Selective attention is mostly considered to be a part of inhibitory control; however, it is not uniformly accepted (Diamond, 2013; Barkley, 1996).

Research on the benefits of physically active learning on working memory consists primarily of the implementation of non-cognitively engaging active breaks. Howie et al. (2014) and Hill et al. (2010) found that the implementation of short active breaks in the classroom before beginning an academic lesson affected students memory use positively compared to lessons without an active break at the beginning of the lesson (Howie et al., 2014; Hill et al., 2010). Janssen et al. (2014) implemented non-cognitively engaging active breaks which resulted in improved working memory use as well as selected attention (Janssen et al., 2014).

Budde et al. (2008) found improved selective attention in adolescents, aged 13–16 years, after both a twelve minute non-cognitively engaging aerobic active break as well as a cognitively engaging coordinative active break. The highest improvements in the executive function of selected attention was found in the group participating in the cognitively engaging coordination active break. Coordinative exercises are believed to improve selective attention by pre-activation of cognitive related neuronal networks. (Budde et al., 2008.) Bailey et al. (2014) on the other hand, found no acute effects of fifteen minutes of coordination as well as aerobic exercises active break participation on selective attention in young adults. In this case, the effects were measured on young adults opposed to 13-16 year olds and immediately after the participation. (Bailey et al., 2014.)

In the school age years of a child, research on the effect of physical activity on executive function can be examined at different points after the activity is complete. Acute physical activity research is characterized by the evaluation of the immediate effects on cognition or executive function, after single bouts of physical activity. (Best 2010, 331-347; Pesce et al., 2009, 16.) Immediate effects of acute physical activity include increased activity in the brain which may improve selective attention in students (Best 2010, 336). Best (2010) also found that some forms of physical activity may benefit executive function in children differently depending on their age. Such as, unstructured pretend play benefiting younger children while older children may benefit more from complex and sophisticated games. (Best 2010, 347.)

Drollette et al. (2014) performed a study where children, categorized in two groups of lower or higher task performance, participated in a task to examine the effects of acute physical activity on aspects of executive function. Their findings resonated with other research with similar research questions, indicating that acute physical activity benefits cognitive performance and use of executive function in children. (Drollette et al., 2014, 59-63; Best 2010; Drollette et al. 2012.) In addition, Drollette et al. (2014) found that children with lower inhibition executive function

may benefit the most from these single bouts of physical activity. These lower task performers with lower inhibition executive functions are the most in need of this activation of the children tested. (Drollette et al., 2014, 59-63.)

Best (2012) suggested that a cognitively engaging physical activity, whether it may be a break, curriculum based or for a lesson, would enhance cognitive function more significantly than a non-cognitively engaging physical activity (Best, 2012). This was proven to be accurate by the study performed by Schmidt, Bezing and Kamer (2016), finding that both cognitively engaging active breaks and curriculum based active breaks impact cognitive function positively. On the other hand, the non-cognitively engaging active breaks did not impact cognitive function. (Schmidt, Bezing & Kamer 2016.) However, Rasberry et al. (2011) implemented both cognitively engaging and non-cognitively engaging physical activity during lessons and both resulted in increased cognitive function (Rasberry et al., 2011).

Academic achievement

The academic related outcome of on-task classroom behavior and cognitive function or engagement relates to academic achievement in general. In the studies mentioned earlier that address on-task classroom behavior improvements also showed improvement in overall academic achievement (Mullender-Wijnsma et al, 2015 eg. physically active learning lesson; Howie, Schatz & Pate, 2015, eg. active break). The improvements in academic achievements were measured by progress monitoring tools rather than grades or standardized testing. Using similar progress monitoring tools several other studies also found improvement in academic achievements after implementing physically active learning lessons (Rasberry et al., 2011; Erwin, Fedewa & Ahn, 2012; Fedewa et al., 2015; Mullender-Wijnsma et al., 2016).

Chronic physical activity research, which implements non-cognitively engaging physical activity, is usually performed by evaluating the participants possible physical, cognitive and social effects after a long-term habitual exercise program (Best 2010, 333; Pesce et al., 2009, 16). Studies focusing on the effects of non-cognitively engaging chronic physical activity on the executive function, such as Davis et al. (2011), have used primarily aerobic training as an exercise program. The findings of the study of young children by Davis et al. (2011) provide evidence that executive function is amenable to chronic aerobic training. After completing the program of aerobic training, children completed tasks that assessed executive function and academic skills. In comparison to the control children who received no intervention of any sort

but participated in the tests; the task results conveyed that aerobic training influenced executive function and a marginal positive effect on mathematical achievement. (Davis et al., 2011, 91-98.)

The study by Vazou and Smiley-Oyen (2014), found that self-reported positively perceived academic competence by the student participants increased with the use of physically active learning methods during lessons (Vazou & Smiley-Oyen, 2014). Aside from cognitive engagement, it has been argued that positive mood or affect could also occur in relation to acute physical activity and cognition (Audiffren & André, 2015). This possible hypothesis, however untested, is based on the results of a continuously growing body of studies showing that positive mood can both support selective attention (Forgas & Eich, 2012, 68-82), and result from acute physical activity (Reed & Ones, 2006; Ekkekakis et al., 2011).

3 Research design

3.1 Research objectives and questions

Through a phenomenographic study, I will research qualitatively the different aspects of teachers' perceptions on the use of, as well as methods of implementation of physically active learning in the classroom. This may result in useful reflections and practices that might be beneficial for the participant teachers themselves, teacher education programs or for the wider public. The importance of including physical activity to classroom activities and the activation of the brain has been shown to benefit student health, learning and concentration as discussed in the theoretical foundation sections of this thesis.

The research questions of this study are:

How do middle school teachers perceive the use of physically active learning during lessons?

How do middle school teachers implement physically active learning during lessons?

3.2 Research methodology

3.2.1 Phenomenography

For the purpose of exploring the perceptions of individual teachers, this study has adopted the qualitative approach. Each individual's conception is constructed from their life experience, values and worldview. Investigating experiences requires an in-depth description of a how or why something has developed. Therefore, a qualitative approach is suitable for the aim of describing and understanding perceptions and methods through analysis. (Kimaryo, 2011.) The tradition of qualitative research is an Aristotelian view that human activity is subjective and therefore, cannot be equated with nature. The definition of the qualitative research phenomenon is that it opposes quantitative study, in which the key data are the numbers. (Tuomi & Sarajärvi 2009, 126.) A qualitative study, however, examines the meanings of the phenomena, seeks contextuality, interpretation and understanding of the views to be explored. Therefore, this qualitative study takes an objective stand with the focus on the phenomenon under study. The meaning of this type of study is emphasized by the hermeneutical nature, which can be simplified as

the interpretative nature of the qualitative study. The qualitative research primarily seeks to answer the questions pertaining to why, what and how. (Hirsjärvi & Hurme 2001, 22.)

The approach used in this research process is phenomenography. The term comes from the root words phenomena and graph. Phenomena represents something as it appears in its own right, while graph means to describe in pictures or words what something means. (Kroksmark 1987, 226-227.) The approach is based on the understanding that in order to comprehend how people handle situations and problems, one must analyze the ways in which they experience the situations and problems. The object of a phenomenographic research is the variation in the ways people experience the phenomena. However, phenomenography is not a method it itself, instead it is an approach to research. (Marton & Booth 1997, 111.)

Methods used in this research process will be based on the phenomenographic approach. This phenomenographic research approach will be realized through an empirical research of the various ways in which people experience, conceptualize and understand the physical active learning phenomena in surrounding world around them. (Ornek 2008, 6-14.) Even though the phenomenon of physically active learning is studied through the individual participants' conceptions, this study is not about the individuals or the phenomenon, but about the relations between this phenomenon and the individuals (Marton, 1986, p. 144; Marton, 1988, p. 179).

When the purpose of phenomenography is to discover the qualitatively different aspects of the ways in which teachers conceptualize and experience physically active learning, then the outcome of the study will be the discovery of a number of these different ways (Marton, 1986, p. 143). The ways discovered will be limited to the number of participants in this study. These qualitatively different ways of conceptualizing of physically active learning will become the categories of description (Akerlind, 2005) and will be the most specific analyzed pieces of the research results.

The weakness of the phenomenographic research approach is what the approach does not encompass, but for this subject area, it might be what is needed. Such as, the lack of a plan for future development in the spectrum of the phenomenon. Action research is widely used in educational research and has the potential to support the shift towards making, in this case physically active learning beneficial for all students and teachers (Hall, 1992). For this research, with phenomenography used as the approach, it can only begin to describe the qualitatively different perceptions the participants have on the phenomenon (Marton, 1986). For further research, the

combination of the two, phenomenographic action research may be able to provide an informed development intervention. (Beaulieu, 2017).

3.2.2 Epistemology and ontology

This research is contained within the frame of relativistic or constructivist paradigm. Research within this paradigm assumes that all truth is constructed by time, social and cultural context and the individual. The goal of this research is understanding perceptions in context instead of the discovery of universal truths. In case of phenomenography the relativistic nature of the knowledge that can be obtained through the study is centralized in people's interpretations of the world or the different aspects of the world. (Marton 1988, 179-181.) Therefore, rather than describing the world as an entity outside of a personal reality, the descriptions of the world are people's conceptions or perceptions of the world or the qualitative ways in which they describe their thoughts (Marton 1988, 147-179). Overall, the ontological basis of this study is that realities exist through multiple mental constructions. Guba (1990) expands upon these mental constructions as "socially and experientially based," (Guba 1990, 27) dependent on the persons who hold them. Marton and Booth (1997) emphasized that the way they experience the world is unique for each person, and each has an internal relationship between themselves and the world. That relationship is one's own, and the way to learn more about the world is to experience the world in a different way. (Marton & Booth 1997, 13.)

The nature of both reality and knowledge in phenomenography is interpreted through the lens of the individual. In this study, the lens is specifically through teachers' experiences of situations, where the experience of the world is reflected in that specific situation. In this study they are any kind of account where participating teachers have considered using, used or observed physical active learning.

3.3 Research context and participants

A focus group is a discussion with group members on a certain topic organized for research purposes, in this case for this research course (Gill et al., 2008, 291-295). In terms of the selection of the focus group, the participants are all representatives of their school in Finland, Lithuania and Denmark, who are aware of their school's use of the phenomena. The participants were subject teachers of various subjects in middle schools. There were no other prerequisites for the participants of this study. In preparation of the focus group discussions, the participants

took part in an in-service training on physically active learning where I, the researcher, was an instructor of the session. The purpose of this session was to activate the participants, define the terms in relation to physically active learning and set a relaxed atmosphere. The focus groups for this research are two groups of three participants. Six participants total with two teachers from each country. The two teachers from Denmark taught in a private school, while the teachers from Lithuania and Finland taught in public schools. The groups were formed so that there is one teacher from each representing country in each group. All the participating teachers have taught for more than three years. The teachers taught anywhere from one to three subjects each. The subjects represented were English, Swedish, Danish as a mother tongue, Finnish as a mother tongue, Science, History, Religion, Math. The participants are listed with their country of origin and subject in the figures and tables section.

To make this experience more meaningful for the participating teachers, an in-service training session was implemented before the discussions took place. The in-service training was an informal approach to define and experience the physically active learning phenomenon and clarify terms such as cognitive engagement and executive function. It also served the purpose of activating participants to support recollection of their own experiences related to the topic.

Not only was this experience meaningful due to the setting of sharing and learning from each other during the discussions, but also, each of the three represented countries have national programs and promotions that call for the increase of physical activity of students even during the school day. When considering where school aged children spend most of their day, it is important to assess for example what the national curriculum requirements are in Lithuania, Denmark and Finland.

In Lithuania, the government has taken measures to increase the amount of physical activity and support an active lifestyle for their citizens. The Ministry of Education and Science (2015) mentions in the national curriculum a recommendation for the promotion of organized physical activity during breaks or lessons. The physical active breaks should occur at least once per day, lasting for at least twenty minutes. (Ministry of Education and Science, 2015.) The Lithuanian Health Strategy of 2014-2025, provides a specific challenge to promote physical activity, for developing optimal physical activity habits. The strategy presents one of the four main goals is to form a healthy lifestyle and culture. It can be said that the Lithuanian Health Strategy 2014-2025 pays attention to physical activity of children and although it is the beginning of the implementation, it reaches out to schools as well. (Graužinienė, 2014.)

Similarly, one of the central tasks of the Lithuanian National Public Health Care Programme 2016-2023, is to increase physical activity of the population in all areas of life. To do this, promotion of physical activity for children and adolescents in pre-school institutions and schools needs to happen. In schools, the promotion includes, informing people about the health benefits of physical activity, providing evidence-based knowledge and raising awareness of health-enhancing physical activity especially to the educators for them to pass the understanding on. Overall the goal is to encourage different groups of the population to choose appropriate physical activity and reduce sedentary time. (Republic of Lithuania, 2015.) Lastly, the National Network of Health Promoting Schools in Lithuania, works towards the vision of a healthier school community. This network organizes different events to promote physical education in schools. (Health Education and Disease Prevention Center, n.d.) This promotion also emphasizes the Lithuanian government commitment of increasing physical activity.

A reform for raising the standards of Danish public schools is in the process of being introduced in Denmark. The reform is based on an agreement, in 2013, by the different political parties. Most of the necessary legislation for its implementation has now been passed by the Danish Parliament. The main goal is to have at least 80% of students achieve average national test scores in mathematics and reading, while gradually increasing the number of high performers and gradually reducing the number of low performers. Overall it aims to improve student well-being. The reform has the following aims to meet these goals: to modify the school day with the distribution of learning times to have more subject-divided lessons and assisted learning, introducing daily physical activity, and opening schools to their communities for collaboration. (Ministry of Education, 2013.) There is also a Danish national classroom-based health program called Active Around Denmark. The Active Around Denmark program includes a promotion of physical activity within the classroom in academic lessons. (Guldager et al., 2018.)

Finnish national curriculum addresses implementing physical activity throughout the school day. Thinking and learning to learn (T1) is a transversal competency from the Finnish national core curriculum states that the development of thinking and learning are supported by diverse physical activities and motor skill activities. Also, the cultural competence, interaction and self-expression (T2) transversal competency in the curriculum includes the concept that positive interaction is encouraged in pupils through many opportunities, including play and physical activity. Lastly, taking care of oneself and managing daily life (T3) is addressed and includes recognizing and developing emotional skills through play and drama, where play can be understood to include physical activity. (Finnish National Board of Education 2014, 105-107.)

Recommendations for human physical activity are continuously updated based on the latest research and the changing society. Physical activity in relation to health is based on the individual, but for purposes of recommendations, the amount, type and frequency is a way to clarify what may be typically beneficial for well-being. The World Health Organization, WHO, (2011) recommends physical activity for youth between the ages of five and seventeen to reach at least 60 minutes daily. In addition to the everyday physical activity, youth should also participate in vigorous physical activity three times per week. (World Health Organization 2011, 1.) The recommendations of the World Health Organization are the minimum recommendation in the European countries including; Denmark, Lithuania and Finland (World Health Organization, 2011).

In Finland specifically, the Minister of Education and the Nuori Suomi ry published physical activity recommendations for youth between ages seven and eighteen years of age in 2008. According to the experts in this article, Heinonen et al. (2008), all youth in the specified age range should be physically active in a versatile way between one to two hours each day. The time spent sitting should not exceed two hours and neither should screen time with electronics. These recommendations are specified to be reached daily, but if the target is not reached on one day it will not have a large impact on the child's overall health. However, if a child is inactive for an extended period, it will have a negative impact on several aspects of the individual's wellbeing. (Heinonen et al., 2008, 9.)

3.4 Data collection

With the focus of this research on the lived experiences that middle school teachers have of the physically active learning phenomena, the data collection was designed so that the participants were able to reflect and speak as freely as possible. Therefore, I choose a focus group method of data collection since it provides a setting that is safe and constructive. When one member of the group mentions an experience, this provides an opportunity for another teacher to relate or recall a similar experience. Also, the participants could possibly be inspired with new ideas or a different perspective from the discussion potentially facilitating a meaningful and constructive experience.

The purpose of using the focus group approach, is for generating information on views that may be collective, and the meanings may be deeper than those views (Morse 1994, 233). More im-

portantly, the purpose is to develop a comprehensive understanding of the participants' experiences of the implementation of physically active learning during lessons. The teacher's conceptions were shared in the focus group discussions and although it can be subject to constraints, the collected data represents the reality of the experiences and perceptions of the group members. The outcome space mentioned as Åkerlind (2012) reviews, is what the phenomenographic study aims to produce. This consists of the categories of descriptions that I, as a researcher, constitute representing different ways of experiencing the phenomena. An important concept to emphasize is the way in which this research aims to explore the range of meanings within the focus group, as a group, rather than the variety of meanings for each individual. (Åkerlind 2012, 116-117.)

The ground rules of this focus group, or group collaboration session is for each of the participants to present the information on physically active learning they have implemented, and what perceptions they might have regarding its use. Ideas that have been successful, challenges with implementing physically active learning, how the idea has been implemented and comments surrounding this presentation of each individual should be shared.

With the format of focus group discussions in use, the participants were each provided with a list of four discussion questions. Each participant looked at the list of questions at the same time and spent a few minutes reading the questions, thinking and writing comments if needed before beginning to discuss. The following questions were given:

As a teacher, what experiences do you have with the use of physically active learning?

How might a physically active lessons affect student's concentration?

What are your thoughts on the idea of *cognitively engaging* physically active learning?

What would you like to know more about *cognitively engaging* physically active learning?

In terms of instructions for the discussion, each group were encouraged to discuss freely using the list of questions as a guide for the interaction. The time of twenty minutes were given for each group discussion with a five minute warning given to signal the time was ending soon. All the participants signed an agreement form that confirmed their willingness to participate and their rights as research participants, including the right to withdraw from this study. The agreement form can be seen in Appendix 1.

3.5 Data analysis

To begin the process of data analysis, I listened and watched the recorded video and audio of the small group discussions. For the first two run through viewings, I focused on listening to clarity, subject matter and familiarizing myself with the discussion themes. With an overall evaluation of the recordings' quality and value of content, I was satisfied after the first two times listening, I considered that it was sufficient for this study.

Transcribing the recordings was the next step taken for the analyzation process. I choose to use a broad approach of transcription with a purpose of identifying general concepts. Focusing on significant content domains, this broad approach purposely leaves out word repetitions, unfinished words, interrupting comments and nonverbal communication. (Morse 1994, 234.) This allows for a clear read and focus on the content without distracting insertions. I watched the video and listened to the group discussions, transcribing the content with many replays of the recordings.

Another aspect that clarifies the transcription when reading is naming the participants while keeping the research participants anonymous. I choose to name the participants simply as A, B and C for each participant in the first group, while the second group participants as D, E and F. When giving each participant a different name or letter, the analyzation process is cohesive when a participant continues a thought or refers to a previously stated idea, later in the discussion.

The common factor of the participants is being a middle school teacher. The variety in the focus group will bring a depth to the data collected. With the phenomenographic approach, this depth can be explored as it focuses on the variety of experiences, perceptions and conceptions on the use of physically active learning (PAL) teachers may have. Due to this methodological trait, it would be appropriate to analyze broad themes in the sessions. (Morse 1994, 223.) In this study, the broad themes will have categories and subcategories. The transcribed text will be clarified as units and categorized into subcategories accordingly.

The process of categorizing and subcategorization were based on the objectives and research questions. To maintain research transparency, the process of defining categories is crucial to explain. After the transcription process was complete, I read through to make sure the text was accurate and understandable. During the process of listening, transcribing and read throughs I noticed there was a variety of perceptions on the use of physically active learning. I began to

highlight the text with different colors according to the type of perception on the use of physically active learning that the teacher spoke about positive perceptions, challenges with physically active learning or aspects needing development. In the following short excerpt of a group discussion transcription, the first step of the categorization process concerning different perceptions is represented. The perceptions are presented with yellow highlighting for benefits and red for challenges

Excerpt from focus group discussion 2:

> Participant D- *"Well in Denmark, I am working in a private school. You have to have 45 minutes for lessons. It is good that it is integrated in the lessons and in the learning process. Not just brain breaks like let's stand up and jump and lose concentration. Integration is then very good, but it takes a lot of cooperation from the teacher and planning games, making copies. I like the thought of doing at least a little bit of it. The last question, I would like to learn more of how can I make the cognitive engaging physical activity without involving that I have to skip preparation for other things since I only have so much time."*
>
> Participant F- *"I am also interested in and would like to know what other Finnish language and literature teachers have done in their lessons on grammar or structure. What they have done during their lessons? How do they think their students are learning?"*
>
> Participant E- *"Yes I would also like to know more. I know quite a few examples already, but students always want to try something new. Doing the same activity or movement every time, they get bored. Oh, that again. I want to know more examples."*

The highlighted segments of the transcribed text are what I named units of meaning. These units of meaning were categorized into separate documents according to the colors of various teachers' perceptions. When the different perceptions units of meaning were separated, the next task was to recognize units of meaning as simplified units. The following list is an example from the challenges list of units. It is only part of the list of units, in this case, the challenges, to show how this process of recognizing units of meaning as simplified units for clarity looked like.

List of Units: Teachers perceptions on PAL use -Challenges

Teachers lack planning time
Requires cooperation
Making copies
Requires creativity
Access of rules and requirements, teacher can only take so much at a time
Supposed to integrate everything, and each aspect needs to be perfect.
Planning takes time
Teachers need to be able to change the plan if students do not adapt, extra plans

Lack of resources
Students always want something new/ need more variety
Not the only way to learn/ so many other concepts need to be addressed
Not as easy to find methods and materials on PAL as other learning styles
Pupils can sometimes just simply sit down
Need more concrete examples

Class scheduling - school culture
Long lessons too much sitting 75 min/ break needed
Just sitting down means you are not concentrating on the right things
If activity is in the middle of a short lesson, time is needed to get concentration back/ losing time
Older students get, more sitting
When thinking PAL teachers think it needs to be so active and special
Elder teachers do not believe in using PAL

School space
Small classroom
Small shared open space
Weather restricts outdoor use
Outdoor space not good for use/ close to big road/ no good outdoor tables

Students adaptability
Active class cannot handle even the simplest task
Immediate loss of concentration
9th grade Students not interested.
7th grade students very talkative
When one student has a separate plan/ style of learning/ distracts other students
Teachers need to be able to change the plan if students do not adapt
Not always good to have an active break when they are concentrating
Small tasks even cause disruption

From the long list of units, I generalized the units into subcategories. Subcategories were defined to decipher the great number of units of each category. The section titles that are in bold are the five subcategories I originally tried to make to interpret the data, but finding that the subcategories are repetitive, I redefined the subcategories to make only three. The process led me to combine the subcategories of teachers lack planning time and lack of resources to be interpreted as a subcategory named taxing on teachers. The next two subcategories of class scheduling-school culture and school space could be interpreted as a second subcategory of school structure and culture. The third subcategory, student adaptability was an appropriate interpretation. The following figure includes the category of physically active learning challenges all the subcategories, as well as some of the units and units of meaning.

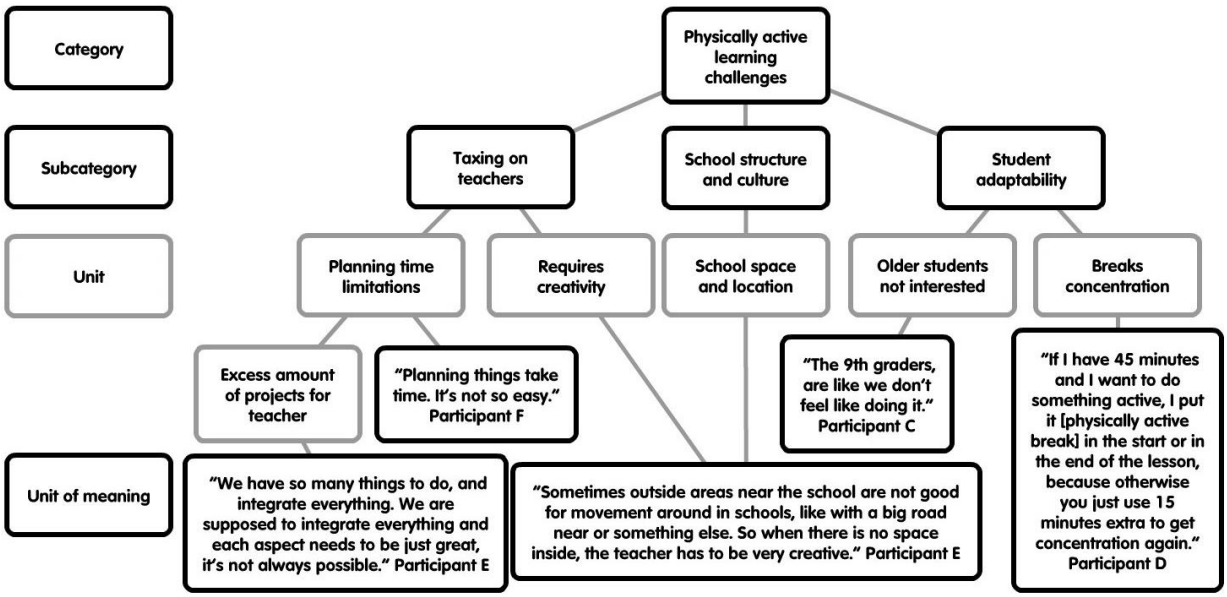

Figure 3: Example of physically active learning challenges with units of meaning

This process was repeated for the physically active learning benefits category as well questions and development category. The three categories all fall under the main theme of teacher's perceptions on the use of physically active learning in the classroom, which addresses the first research question.

A similar process was used for the research sub question on how physically active learning is implemented in the classroom. Methods of implementation were highlighted and considered units of meaning from the transcribed text, only to find that the ways of implementation were different in relation to the lesson content as well as length of implementation. These units of meaning were simplified into a few words of description and labeled as simply units. The methods I learned the teachers used during lessons fell into three different categories; non-cognitively engaging physically active breaks, physically active breaks reviewing curriculum goals and integration of physically active learning into lessons. These three types of methods found became the categories for this second theme.

4 Results

4.1 Teachers' perceptions on the use of physically active learning

To begin the analysis process, the focus will be on the main research question, **how do middle school teachers perceive the use of physically active learning in the classroom?** The first step of the analysis process is to define the various themes as categories that are found in the focus group discussions. The main categories were based on the benefits for students, challenges with implementation and questions and development ideas all from the teacher's perspective. To define the various teachers' perceptions on the use of physically active learning in the classroom, I divided perceptions into categories and subcategories which is found in the figure below.

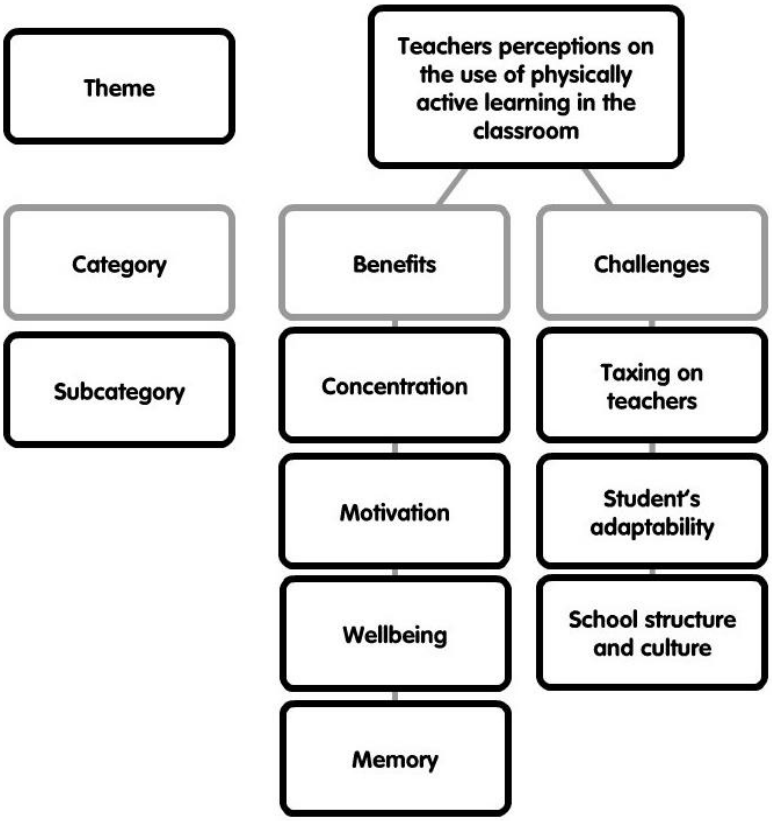

Figure 4: Teachers perceptions on use of physically active learning in the classroom

The focus groups began their discussions with a personal introduction, but more importantly, an overview of their experiences of PAL in the classroom. Focus group 2 shared basic methods of keeping lessons outside and explained that this makes PAL possible due to the small classroom size. Participant E is an English teacher from Lithuania and explained a challenge as well

as a solution for this issue. *"Since our classrooms are so small, we are using in the winter corridors and if possible, we use the gym hall."* (Participant E) This was the tendency of this group discussion, to mention a challenge as well as a solution or coping technique. In the following sections the subcategories are focused on the specific perception, benefits, challenges or questions and development issues on physically active learning in the classroom. Overall, the teachers displayed interest and trust in the benefits of increasing physical activity.

4.1.1 Benefits of physically active learning

An analysis of the student benefits of PAL implementation can be considered as a category to the theme of teachers' perceptions on use of PAL in the classroom. In terms of the benefits of PAL according to the participating teachers, improvement in student's memory, motivation, concentration and wellbeing in lessons are the four subcategories I found to be addressed in the focus group discussions. In Figure 5, found below, the category, subcategories and examples are visually displayed.

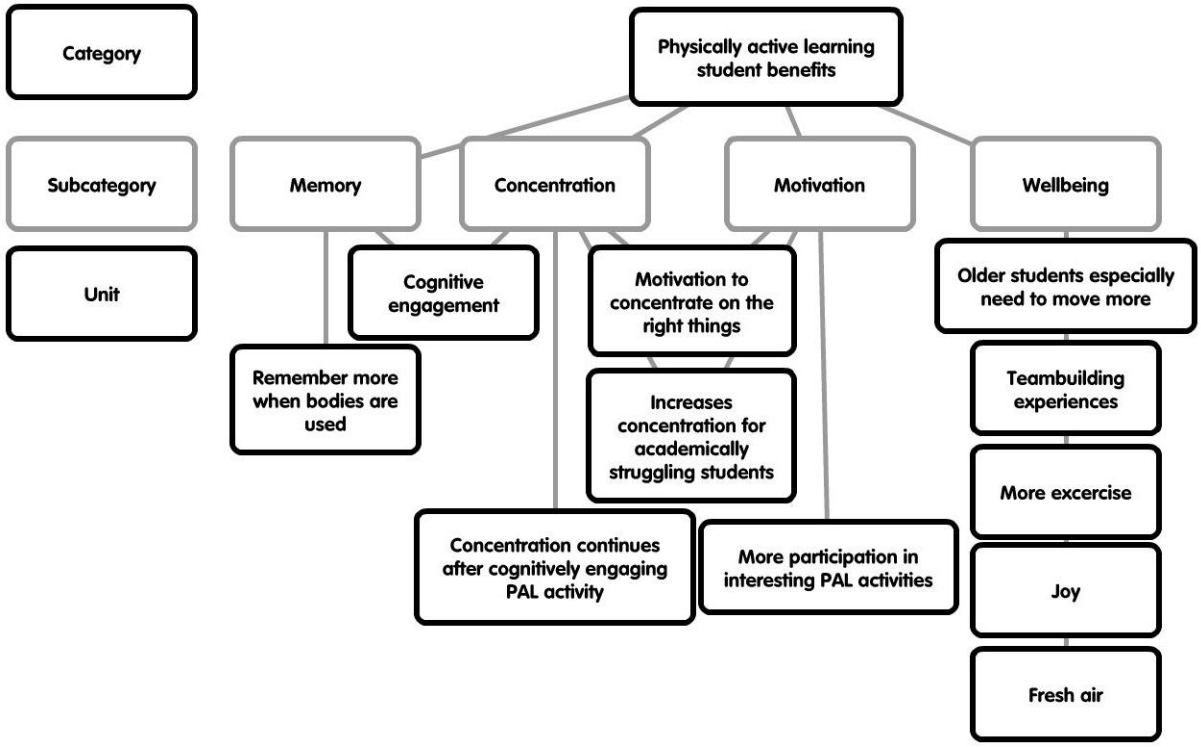

Figure 5: Physically active learning student benefits

The perception that PAL improves concentration was interesting since the teachers in one discussion stressed the idea that students that receive poorer results in school benefit the most from PAL. During the in-service training before the group discussions, the teachers viewed a diagram

from Drollette et al. (2014) about the activeness of the brain before and after an acute bout of exercise. The main comparison of brain activation in this diagram is the difference between how an acute bout of exercise affects the brain for high academic performers and low academic performers.

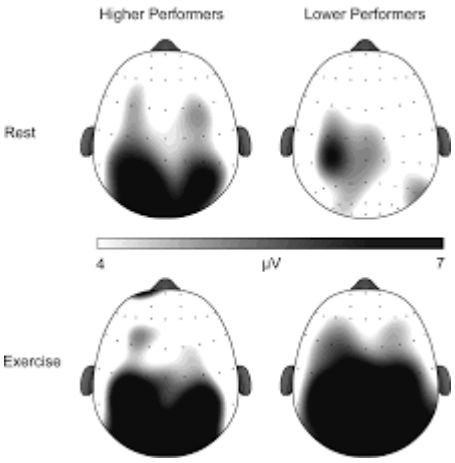

Figure 6: Drollette et al. 2014, 60. Developmental Cognitive Neuroscience.

A central finding of this study was that the short bout of exercise had a greater effect on the academically lower-performers brain activeness. One English and Swedish teacher from Finland, referred to this image or picture to emphasize the importance of the PAL benefits for the lower performers.

> *"They are able to concentrate more. I believe in the theory of students concentrating better, but I think that the main point of the pictures was for the good students who are able to concentrate and work and get good results it's not that important, because work well anyway, but especially for those a bit poorer students who don't have such good results, it's especially important for them. I think most of the time they are the ones who keep moving ...and you have to concentrate more on them."* (Participant C)

The other teachers in this focus group went on to give more examples of how the lower performing students benefit more and need the PAL or physically active breaks to be the best learners they can be. Also, another teacher supported the previously mentioned idea of the walk and talk activity that it supports students to participate in more fruitful discussions on a subject matter they are learning about.

Teachers in the discussion expressed that achieving engagement through PAL in a lesson supports the student to increase their concentration, working memory usage, and motivation. These aspects of improvement mentioned by the teachers are supported by research in relation to the

executive function. The executive functions are the cognitive processes that allow for goal-directed cognition and behavior (Banich 2009; Best 2010, 331). Wijnsma (2017) and Pesce et al. (2009) found evidence on the benefits of a physically active lesson for executive functions such as selective attention and working memory (Wijnsma, 2017; Pesce et al., 2009). When discussing cognitive engaging PAL, the English teacher from Lithuania, stated the following:

> *"I think that a physically active lesson makes students more motivated. They can concentrate better during the lesson and remember all the material better."* (Participant E)

This statement refers to the benefit physical activity provided to the executive function of working memory. Other teachers agreed with this perception and expanded upon this with the idea that concentration and the use of working memory continues after the PAL activity especially when the integration was cognitively engaging. When teachers brought up student wellbeing and its importance, it was clear all the participating teachers agreed on the need for its consideration in the classroom. PAL implementation was a simple way for the students to get more exercise, support team building experiences and get fresh air outside.

> *"I sometimes use that you go out to get some fresh air. Then when you come back in you will do this and this, so they know when they are coming back, they know what they have to do. It helps."* (Participant A)

This teacher suggested this idea of an active break to support the students getting more exercise and fresh air during the day. The participating teachers were all middle year's teachers, so their students sit even more than primary years students (Malina, Bar-Or & Bouchard 2004, 467-468). The teachers discussed this lack of movement in middle school students and stressed the need for getting their students to move and go outside to support their wellbeing.

When one teacher was explaining an activity of physically active learning that required the students to find answers to questions by orienteering with a map in a new area, the benefit the teacher mentioned in this example was the joy the students expressed while and after participating in the activity. *"It's a great activity. The students like running somewhere in an area they don't know well, just with a map."* (Participant E) Joy experienced during a lesson or task supports the student's wellbeing and attitude towards school and learning.

4.1.2 Challenges of physically active learning

When analyzing the challenges of the use of PAL based on the participating teachers' perceptions, it is important to state that many of these challenges were addressed by the teachers themselves with ways the application or use of PAL can overcome the challenges. The challenges include the taxing nature on teachers in terms of lack of resources and variety in resources, lack of time, requiring creativity and the overall feeling of incompetence implementing PAL. Secondly, the school itself in terms of space and culture were discussed as challenges. Lastly, students' needs and adaptability were perceived in the teacher's perspective as substantial challenges. Challenges are a crucial part of the development of PAL, its use and improving understanding of what it is in practice. The theme of teacher's perceptions on the use of physically active learning and category of challenges is broken down into subcategories in the diagram below. Below the subcategories, taxing on teachers, school structure and culture and student's adaptability, which are teachers' perceptions keeping the categorization transparent.

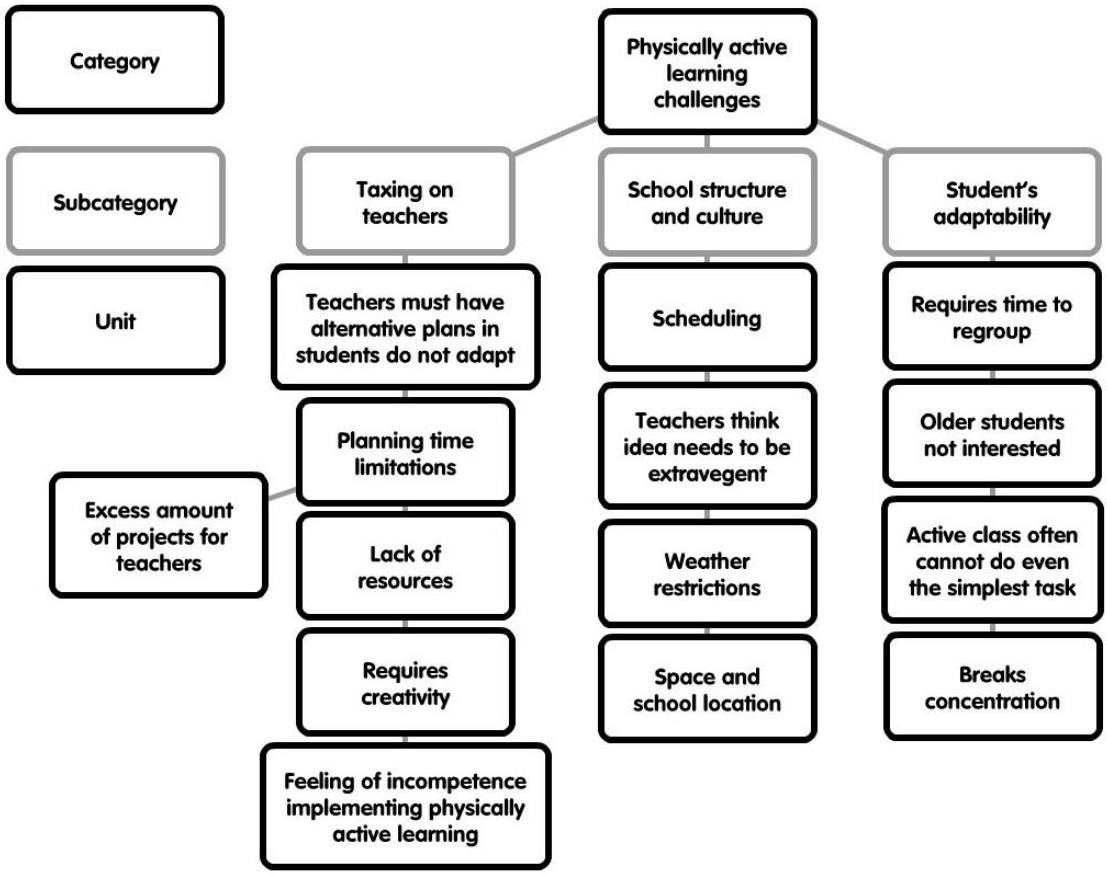

Figure 7: Physically active learning challenges

Teachers in the focus group discussions perceived implementation of PAL to be taxing on the teachers themselves. The challenges in terms of teachers' time and resources in were stated in

a variety of ways. One teacher related that PAL implementation required time to cooperate with others, make copies and learn about a method or game first before the actual implementation. *"Planning things take time. It's not so easy."* (Participant F) Moreover, the other teachers continued that teachers are expected to integrate many other concepts and do it all well. *"We have so many things to do and integrate everything. We are supposed to integrate everything, and each aspect needs to be just great. It's not always possible."* (Participant E)

Not only did the teachers relate the lack of time and the excess amount of pressures to integrate "everything," one of the participants stated that PAL methods and ideas are more difficult to find that other teaching styles that do not require movement. *"It's much easier to find methods on the topic than movement. In Lithuania, we don't have much idea banks for physical activity."* (Participant E) The lack of resources was expressed by all participating teachers as a challenge, and they asked for examples. "*More concrete activity examples would be helpful."* (Participant D)

The challenge with a need for more examples brings us to the feeling of incompetence for implementing physically active learning during lessons the teachers expressed throughout the focus group discussions. The feeling of incompetence was present when teachers expressed an interest to know what other teachers are doing, a need for further in-service training and a need to know what research shows in terms of learning when using different types of physically active learning methods.

The need to know what other teachers may be doing in their classrooms is not only a call for more ideas, but also what the effects of these practices are on learning results. This perception is what I interpret as a feeling of incompetence, but while this is a challenge, it also is an expression of interest.

> *"I am also interested in and would like to know what other Finnish language and literature teachers have done like when have done in their lessons on grammar or structure. What they have done during their lessons? How do they think their students are learning?"* (Participant F)

One of the groups discussed in detail about the need for a forum for teachers to share ideas and find ideas easily on their exact topic they are teaching. The Finnish teacher from Finland in the group brought up the idea that support in this department is developing currently. *"In the city of Oulu, we have this email list or space to put the examples that work."* (Participant F) Also, on the same topic, but the next step in service training, the same teacher continues,

> *"In Oulu, it is good that university is also involved in this program. They are teaching our teachers. For example, from our school one of the math teachers, one of the language teachers, and one of the art teachers and one of the biological, history teachers has been here. And from the university they have taught how to use these methods."* (Participant F)

Incompetence expressed through needing to know what research shows about student's actual learning were concerning all aspects discussed during the focus discussions, but the most specific questions were about the difference between physically active breaks and cognitively engaging activities in terms of learning.

> *"It would be interesting to see some, if there are some differences [between breaks and cognitively engaging PAL]. Ok if there are two classes and one of them does these more, and the other doesn't use these methods. So, are there differences in the learning results?"* (Participant C)

The perception of implementing physically active learning to be challenging was formed in part due to the feeling of incompetence and lack of knowledge of how physically active learning in its various forms affects learning results. These perceptions are ones that can be addressed through the teachers call for more training and information which is why it is significant to categorize these perceptions.

The school space and culture, which includes scheduling choices, are among the challenge's teachers perceived. The classroom sizes are small as well as the shared school space. This shared space can be hallways, lobbies or gym halls. Also, the weather is a factor of how useful and practical the outdoors may be for PAL implementation. *"...especially in Denmark and Copenhagen when many schools don't have space indoor and then outside it's raining half the time."* (Participant D)

Students adapting to a different teaching method takes time and, in some cases, students may never succeed to completely adapt. In this case, the foreign language teacher from Finland expressed that one needs to be flexible and realize this. *"You can't really plan your lesson too carefully you have to be able to change the plan."* (Participant C) For example, one teacher related that some classes are so active that even when implementing the simplest physical activity, the teacher cannot manage to keep the class in order. The science teacher from Denmark expressed that they preferred to implement different types of activities due to different group dynamics.

> *"I have a class that is not a very quiet class. The not so quiet ones they need to have very closed place of working. Even if you say now you can take out your books and it's like "puh"!"* (Participant D)

The challenges teachers face while teaching with PAL, are many, but the positive outlook is that many of these challenges the teachers themselves addressed with ideas to overcome them. My interpretation of this is that the teacher's do find this practice beneficial and important enough in their students' lives. This importance is an indication of the motivation they must make PAL a part of their teaching practice.

4.2 Teachers' perceptions of implementing physically active learning during lessons

The participating teachers' perceptions of PAL were present during the focus group discussions prominently through descriptions and explanations of the implementation of PAL in their current classrooms. The primary focus of this section is on the sub research question; **how do middle school teachers implement physically active learning in their classroom?** Therefore, for the analysis process, physically active learning in the classroom is the theme of focus. The various implementation methods in the classroom fall into three different categories. The categories include; non-cognitively engaging physically active breaks, physically active breaks reviewing curriculum goals and integration of physically active learning into lessons. Along with this categorization, the differentiation between methods with cognitive engagement and without cognitive engagement will be addressed. Cognitively engagement with physically active learning is a concept that requires the teacher to plan an activity that activates student's cognition or executive function in the same way as the lesson learning goal or concept requires (Best 2010, 348). The purpose of differentiating between cognitive engagement and non-cognitive engagement in physically active learning implementation methods is derived from studies that have compared the methods according to cognitive engagement and found a significant difference in academic outcomes (Watson et al., 2017). The breakdown of the focus of the research question concerning teachers' perceptions of implementing physically active learning during lessons into categories with underlying examples, or units, of the implementation method is found in the figure below.

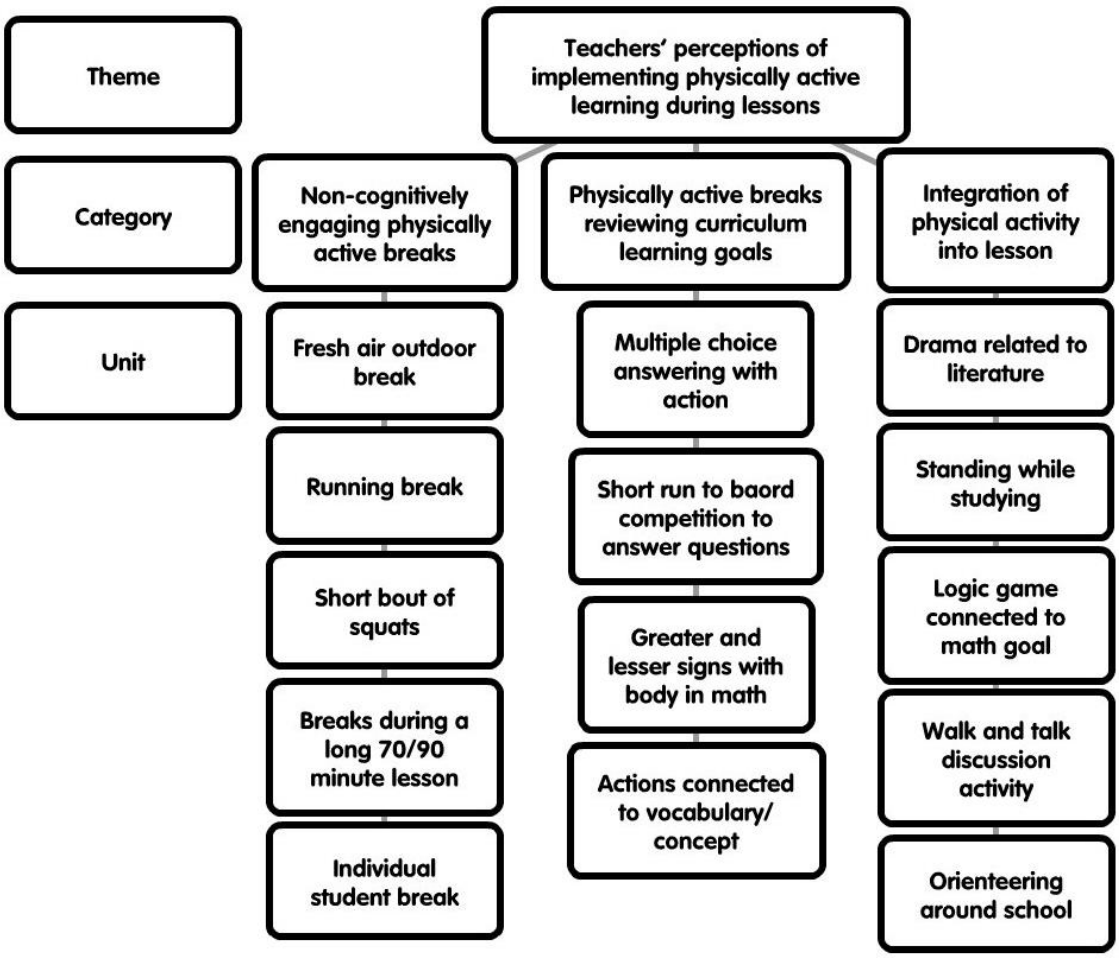

Figure 9: Teachers' perceptions of implementing physically active learning during lessons

4.2.1 Non-cognitively engaging physically active breaks

The category, non-cognitively engaging physically active breaks, includes implementation methods used by the participating teachers especially during long lessons for the entire class, as well as active breaks for individual students who needed a break. The active break idea was used to rest the minds of the students and take some time to move and breathe, without the need to focus on the task or subject content for a short moment. In terms of cognitive engagement, all the physically active breaks mentioned by the participants were non-cognitively engaging. The active breaks were generally well received by students, but also caused disruption according to the participating teachers. For example, when the foreign language teacher from Finland explained that you cannot expect students to continue working after an active break in the middle of the lesson.

> *"Then, you have the feeling that I have to make them move a bit just to get them some exercise. It might make it difficult to make them sit down again quietly and concentrate. So, it is not always the thing that ok that you stand up and then they just continue working. It doesn't always work."* (Participant C)

Participant C continued and mentioned one of the exercises they might have for an active break. *"In lessons we might have some breaks and just do some squats."* (Participant C) The science teacher from Denmark, Participant D, mentioned using running breaks outside which is a similar type of break since both do not require cognitive engagement. Teachers cautioned to avoid using these types of breaks when students were concentrating well or during the middle of a short lesson. The brain breaks or active breaks for individual students were recommended to aid those students who struggle with sitting for as long as other students.

The Danish language, history and religion teacher from Denmark, Participant A, mentioned that they have arranged for a particular student to take a non-cognitively engaging active break alone when it was needed. This arrangement of an agreement between a teacher and a student has allowed the student to get the needed active break while the rest of the class and teacher may stay focused and motivated on the subject or task at hand. *"So now we have said to him that if you want to go out and do it through that because it is better than you are sitting here and..."* (Participant A) This requires more effort and a discussion to come up with the plan and activity of choice. However, when the need for a break comes up, it only takes a moment to acknowledge the need and it happens. The foreign language teacher from Finland in the group, continues the discussion with what they are doing to implement an individual student break and expressed that all students benefit from this.

> *"Once I had a student who was in 7th grade he had really difficulties concentrating. We made a deal that, ok, you can walk around the classroom, but don't talk to anyone. Because otherwise he kept talking to his friends, and then it worked well. It was like, ok, I have to go now, and he started walking around. Everyone else was like, what is he doing, but then they got used to it."* (Participant C)

Although these individual active breaks were a disruption at first, the other students adjusted and got used to one student moving around at times. The individual student's attention improved and caused less disruption than before just by taking a break and moving when needed. Therefore, all students in the class benefited since over time there were fewer disruptions to the lessons. This idea was supported by the other teachers in the discussion group to be successful.

4.2.2 Physically active breaks reviewing curriculum learning goals

The second category in terms of teachers' conceptions of physically active learning implementation is the physically active breaks reviewing curriculum learning goals. This type of physically active learning implementation is always cognitively engaging since it is used to review a previously covered concept or topic (Mahar et al., 2006; Bailey & DiPerna, 2015). The Foreign language teacher from Finland explained a way to check the students current understanding quickly without even talking. The subject matter was something previously learned.

> *"I also use answering like if students have multiple choice and to check answers without talking. If you answered A, you jump, B, you squat and C, you make an airplane. So, lots of those kinds of things."* (Participant C)

The math teacher from Lithuania used a similar approach to check students' understanding, but in the context of math. *"We use the greater and lesser signs in math as actions."* (Participant B) This was a short intervention, and the students had to move to make the signs. It required the students to think first, engaging the executive function, inhibition.

The teachers did not only use these learning goals reviewing physically active breaks to check the student's understanding. They also implemented the activities for the students to recall what they have learned and see questions answered by their classmates for more review. For example, the English and Swedish teacher from Finland used a relay race to review vocabulary words. Not only do the students try to recall the word when it is their turn, they see their classmates giving their answers and seeing what the right answers are immediately.

> *"We might have something to do with vocabulary in the English or Swedish lessons. Then we study them together. For example, I write 10 words in English on the board. The students try to study and repeat the words to make sure to memorize them. Then, the students make two lines, and it's like a competition with teams. I say the word in Finnish, and the one that runs to the blackboard first and touches the correct word in English first gets a point."* (Participant C)

Teaching language lessons with the focus of recalling and memorizing seemed to be supported with physically active breaks. In an English lesson, the teacher from Lithuania used an adventure type of task to activate students reviewing a concept previously learned.

> *"We try to have some lessons that students in lessons can go outside, to get something which is hidden somewhere outside or in the corridor. They have to bring it back to solve some task."* (Participant E)

The physically active aspect of this activity could be adjusted according to the students, space and time restraints. Another versatile activity was also mentioned and applied in multiple ways by all the participants is simply by using the working memory executive function to remember actions or movements in relation to some learned term or idea.

> *"[Physically active learning is] used for mother tongue language or literature lessons. If you think about the sentence, there is a subject and then there is a verb. So, I think she has some kind of games about the sentence structure. Just to have a certain movement for the subject and the verb."* (Participant C)

The activity requires the student to remember the term and the coordinating action, activating the working memory part of the brain. Not only is the student recalling the previously learned knowledge of what part of the sentence is being referred to, but also recalling what action the part of sentence has been given.

4.2.3 Integration of physical activity into lessons

The last category of physically active learning in the classroom, is the integration of physical activity into lessons. When a physical activity is integrated into the lessons, it is often considered physically active learning and used to familiarize and teach new lesson content (Riley et al., 2016; Riley et al., 2015; de Greeff et al., 2016; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Mullender-Wijnsma et al., 2016). These examples are often cognitively engaging. Physically active learning with cognitive engagement, is a concept that requires the teacher to plan an activity that activates student's cognition or executive function in the same way as the lesson learning goal or concept requires (Best 2010, 348).

The analysis of the data has allowed for the interpretation of the comments to realize the different implementations of cognitively engaging physically active learning. This concept of cognitively engaging physically active learning was addressed in the in-service training session prior to the focus group discussions which helped avoid confusion as it is quite a specific topic to be covered. Implementation of cognitively engaging physically active learning was overall clearly conceptualized by the participants as well as appreciated to be beneficial, as the science teacher from Denmark explained.

> *"It's good that it is integrated in the lessons and in the learning process, not just brain breaks like, let's stand up and jump and lose concentration."* (Participant D)

Examples given in this area are often what the teachers thought required only a change of mind-set as to what is an organized lesson. The Finnish language teacher contributed with the idea of standing up desks, *"Sometimes when we are writing essays, we are only standing up."* (Participant F) Students were able to be on their feet and move just a little while still focusing on the writing task.

One example of integrating physical activity into a lesson was the use of orienteering. The concept of developing a physically active learning lesson that required the part of the brain used to navigate and focus. Also, the tasks at each place the students navigated to have some hints in English, since that was the subject of the class. As the researcher, I interpret this activation of the brain to be connected or parallel with the learning goals of the lesson.

> *"For orienteering around the school. We might give them some questions and hints. Where do kids eats, and then they have to think about it and then go to the lunchroom and find a question in English that has a hint for the next spot. Then they orienteer around the school."* (Participant C)

The English teacher from Finland was able to implement a cognitively engaging physically active lesson that was directly related to the curriculum learning goals of understanding and putting to use directions in a meaningful way. Another teacher, the English teacher from Lithuania, also spoke of the orienteering idea, although they were in a separate focus group discussion from the previous example given by the English teacher from Finland.

> *"It's a great activity. The students like running somewhere in an area they don't know well. Just with a map."* (Participant E)

This teacher from Lithuania explained the use of orienteering to be great also in an unknown space for the students. This example of physically active learning integration with orienteering is a clear example of cognitive engagement. To simplify this concept of the activation of the brain to be parallel with the learning goals of the lesson, the students need to think in the same way as when they could need to, when using the English language outside of the classroom. They need to move and think on their feet. Collaboration is needed, recollection of what something means, all within the context of the learning idea.

Four out of the six of the participants talked about having used the walk and talk concept. This was an effective basic integration of physical activity into a lesson. The Danish, history and religion teacher from Denmark, pointed out that making sure that the students know what to do when they come back to the class avoids chaos.

> *"I have a lot of you can call it talking subjects so I use the walk and talk, like talk about what you think about this and they can go outside and come in and continue."* (Participant A)

The other focus group, spoke of the walk and talk idea as well, and expanded upon this exercise, saying that it can be applied in a variety of ways. Examples of the possibilities suggested included; outdoor or indoor, answering a list of questions or requiring preparation prior to the activity, done in pairs, small groups, or with the entire class. The walk and talk idea received positive feedback from all participants when it was mentioned in both focus groups. It was fruitful in all benefit categories; concentration levels, motivation, memory and wellbeing for students.

5 Discussion

5.1 Quality of research

In this empirical study, measures have been taken to ensure the validity and credibility. First, as one of the purposes of a phenomenographic approach to research is to explore the participants' understanding and conceptions of a phenomena developed through their lived experience. I, as the researcher, have intentionally bracketed myself out of the focus discussions in order to allow the participants to express their true description of thoughts and understanding of the phenomena. Second, the focus group discussions without a moderator provides the opportunity for the participants to freely address the topics which they think are relevant to the study. This again increased the credibility of the study. Third, intentional measures have been taken to create a natural and comfortable discussion environment, such as the informative and active session on the phenomena and a chance for the participants to recall and solidify their thoughts and develop questions on the subject matter. Lastly, the discussions have been video and audio recorded. This provides an opportunity to transcribe the participants' descriptions and allows the researcher to revisit the participants words avoiding misinterpretation.

Throughout the data collection, transcription and analyzation, I have reported every step of the process in detail. When analyzing the data with a qualitative phenomenographic approach, the interest was in the different perceptions of the collective group of participants, rather than each perception individually (Ornek 2008, 6-14). During analyzation of the data I refrained from relating my perceptions and opinions to avoid interpretation from my subjective perspective. However, with all research, the researcher's perspective is inevitably an influence in categorization choices. To minimize the influence of my perspective on the study's reliability, I include many direct quotations from the focus group discussion to illustrate the depth of each category. The emphasis in presenting the results of the data was also the diversity of perspectives on the subject matter to increase the value to the qualitative process. (Morse 1994, 223.) The conclusion section includes a reflection on the different perceptions of physically active learning present in the data, however, I tried to include all various ideas and perceptions to avoid the emphasis on one perspective over the other.

Regarding the reliability of a study there are always areas to take into consideration and from which, arise challenges requiring the researcher to make imperative choices. These concerning areas in this study relates to the small number of participants, the in-service training session and

the methodological approach. In terms of the participants and the decisions related to the data collection, factors affecting these choices include language issues, knowledge of subject matter and timing of opportunity. Although I, as the researcher, am sufficient enough in the Finnish language, it is not my mother tongue. Performing the study in Finland and the discussions in English, required me to find an opportunity where English could be the language of discussion. This challenge affects the study since the available option included only six participants, who were from three different countries; Finland, Denmark and Lithuania. The small number of participants lowers the credibility since the results include perceptions from only six teachers. The variant of employment in different countries also broadens the study making it less specific, which in turn may be less useful. The implementation of the in-service training on the researched topic prior to the focus group discussions for the data collection, affects the reliability since it influences the participants opinions, ideas and choice of words. Lastly, the methodological approach as addressed earlier is limited to analyzing, defining and describing the various ways participant teachers perceive physically active learning in the world around them (Marton, 1986) and does not address a way to move forward, although I took the opportunity to address this aspect of development as an area of further research.

From one understanding, ethics can be defined as a perspective or method for understanding how to act as well as how to analyze complex issues (Resnik 2015). The main ethical issues concerning the research process according to Fouka and Mantzorou (2011) are, informed consent, beneficence, respect for confidentiality and respect for privacy (Fouka & Mantzorou, 2011). In my research process, all participants were notified in advance of the research procedure and given a form of permission that the data recorded could be used for this study. All six participants signed the permission form and agreed to be on video and audio recording. In terms of beneficence, my research did not and will not harm the participants in any way. In respect to confidentiality, the participants names and school names have not been used. Concerning privacy, the teachers were satisfied with the terms and did not feel their privacy was negatively affected. They expressed this by signing the agreement drawn up for these specific focus group discussions.

5.2 Conclusions

In order to deepen understanding and make use of the knowledge and results of this study, the conclusions section will include a brief summary of the study results. Following the summary

will be a discussion of how the results can be understood through the theoretical framework; as to what ways the results are aligned with the theories presented earlier and what areas are not addressed by the participant teachers. The motivation for this study was to bring to educators' attention to the relation of how one perceives implementing physically active learning during lessons and how one perceives the use of phenomenon during lessons. The significance of this study is also centered around the need for the perceptions of teachers and implementers of the physically active learning phenomenon to be brought to the forefront to support a future of applicable and constructive research in this field. The explicit purpose of this research was to find out through an empirical process, answers to the following questions.

How do middle school teachers perceive the use of physically active learning during lessons?

How do middle school teachers implement physically active learning during lessons?

The research results for the first question, which were found through the data analyzing process, revealed that teachers perceived the use of physically active learning during lessons as beneficial as well as challenging. The benefits perceived by the participants included improvement in student's memory, motivation, concentration and wellbeing during lessons. The benefits according to several participants was that physically active learning may be even more beneficial in terms of concentration and motivation when cognitively engaging activities were implemented. On the other hand, challenges perceived with the use of physically active learning during lessons consisted of being taxing on teachers, struggling with set school structure and culture, as well as the concern of student's adaptability. Most of the participants expressed that teachers are expected to implement and succeed at everything in so many different focus areas, and that it is not possible to focus on several different development areas and succeed with implementation. The teachers had difficulty implementing effectively and felt incompetent, lacking knowledge and methods, however, the participants expressed interest to learn and to develop in this area.

The second research question results included the teacher's perceptions of implementation methods during lessons. The methods described by the participants included; non-cognitively engaging physically active breaks, physically active breaks reviewing curriculum learning goals and the integration of physical activity into a lesson. The non-cognitively engaging physically active breaks were short and detached from the lesson goals. Teachers cautioned not to use this method during the middle of the lesson due to the challenge of a break in student concentration,

relating to the concern of student's adaptability. Physically active breaks reviewing curriculum learning goals were used to check students' understanding and to have students recall what was previously learned. When integrating physical activity into a lesson, the participants used some methods that were directly related to the cognition needed for the lesson content while some methods were separated from the lesson content. An example of a method directly related to lesson content, was the method of orienteering around the school for language learning. A method separated from the lesson content was explained as simply standing up while working on the lesson tasks.

Overall the variety of implementation methods discussed by the participants is significant since it shows that the teachers have been aware of the phenomenon and have seen some benefits to continue to implement methods in the future. The benefits the teachers mentioned were aligned with the theoretical framework in several areas. Many of the challenges addressed by the teachers may have some type of research based solutions or perspectives. This research is significant since it provides an opportunity to realize what areas can be emphasized, in terms of benefits not mentioned or ways to deal with challenges mentioned, to educators in the future.

When mirroring the research results of participants perceptions of implementation methods through the lens of the theoretical background, the systematic review and meta-analysis executed by Watson et al. (2017) also divided physically active learning implementation methods into three categories. The Watson et al. (2017) categories have similarities to the participant perceptions categories, presented in the results, as well as significant differences. The categories consist of physically active breaks, curriculum based physically active breaks and physically active learning lessons. The participants also spoke of two different types of physically active breaks, although these two types mentioned by the participants, excluded cognitively engaging active breaks that were not explicitly curriculum based. According to Watson et al. (2017), the academic related results of non-cognitively engaging active breaks were not as significantly beneficial as the cognitively engaging active breaks even if the cognitive engaging activity was not directly related to a curriculum goal or topic. (Watson et al., 2017.)

The teachers that explained the successful implementation of a non-cognitively engaging active break for an individual student, supported the specific student's ability to concentrate and that over time. The perception was that the use of physically active learning was beneficial to the individual and that even with this activity, the other students adjusted over time to not being bothered by the movement of a classmate. One of the main challenges these teachers brought

up was the disruptive nature of having physically active breaks for all students during lessons. However, these disruptive physically active breaks methods mentioned, did not relate to the subject matter and were non-cognitively engaging. As mentioned in the theoretical framework, the study by Schmidt, Bezing and Kamer (2016), comparing cognitively engaging and non-cognitively engaging physically active breaks, found that only the group with cognitively engaging physically active breaks showed an impact on cognitive function (Schmidt, Bezing & Kamer, 2016) which can lead to beneficial academic outcomes (Watson et al., 2017). Could the participants use of a non-cognitively engaging physically active break, rather than a cognitively engaging activity related to the learning goals, be the reason for the disruption? Further research could be done on the use of non-cognitively engaging physically active breaks as to when they may be beneficial.

The use of cognitively engaging physically active breaks and physically active learning lessons according to the definition of Watson et al. (2017) was discussed by the participants only for review of previously learned curriculum content. However, these methods of integrating physical activity with the curriculum content has also been researched as beneficial for academic outcomes when used to introduce new content as well (Watson et al., 2017; Riley et al., 2016; Riley et al., 2015; de Greeff et al., 2016; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Mullender-Wijnsma et al., 2016). Not only are the cognitively engaging and curriculum related physically active learning methods used to introduce new content, studies also convey that students are able to make connections with the new content with previously learned ideas or life skills when introduced in a physically activated way. (Riley et al., 2016; Riley et al., 2015; de Greeff et al., 2016; Donnelly et al., 2009; Mullender-Wijnsma et al., 2015; Mullender-Wijnsma et al., 2016).

The participant's perceptions on the use of physically active learning during lessons included the benefits to an individual's wellbeing in terms of getting more exercise, fresh air and experiencing joy during the school day. These areas are addressed and confirmed by researchers (Audiffren & Andre, 2015; Bailey et al., 2014), but the areas related to social and emotional development as well as its connection to academically related outcomes were only once briefly mentioned by a participant. A positive mood experienced during a lesson, such as when one participant teacher mentioned students experiencing joy during the physically active learning activity, is also significant concerning academic outcomes. Forgas and Eich (2012) found in their study of how a positive mood can favorably support the use of selective attention when experienced during a learning moment (Forgas & Eich, 2012, 68-82).

Physically active learning increases participation as well as activeness of students, which in turn increases student's school satisfaction (Hokanen & Suomala, 2009). This aspect of satisfaction was briefly mentioned in the discussions, but this increase in school satisfaction is directly related to the positive influence physical activity has on the student's awareness of their body. Awareness of one's body includes its ability to move as well as self-knowledge. (Laakso et al., 2007, 42.) These aspects and their development support the overall student wellbeing and increase the significance of physically active learning research and development. This aspect, among others, supports that physically active learning is a great opportunity especially for academically struggling students.

Another aspect not mentioned in the focus group discussion in relation to wellbeing is that with the implementation of physically active learning during lessons provides an opportunity for students to develop social skills with more social interaction (Bransford, Brown & Cocking, 2003). In terms of emotional skills, physically active learning has the potential to help students build self-confidence and improve control over symptoms of anxiety and depression. An increase of physical activity during the school day can also support life rhythm, falling asleep at night which in turn can improve school attendance. (Terve koululainen, 2013.) Bringing the focus back to the theoretical foundation of physically active learning during lessons and its connection to Vygotsky's theory, the increase of social interaction that occurs with physical activity can support deeper learning. When students can interact with peers to confirm their understanding as well as step more bravely out of their comfort zone, this allows for deeper understanding which in turn may boost enthusiasm and confidence. (Vygotsky, 1978.)

Throughout my research process of previously done studies, the perceptions of the actual implementers of physically active learning during lessons, the teachers, has been lacking. Riley and colleagues (2015) addressed the lack of teachers included in the development of a physically active learning intervention program as negatively affecting the sustainability for an intervention (Riley et al., 2015). One perception of the participant teachers in this study was the importance of keeping a critical perspective with implementation. Several participants stated that physical activity is simply not always the best way to activate, teach or review subject matter. This perception could be based on the students in the class, the individual teacher, subject matter or other variables. Since teachers expressed their lack of time for planning physically active learning activities, it may not always be the priority, nor should it always be, to implement physically active learning. These perceptions could be addressed in research or even researched further as to when not to use physically active learning methods. Also, when creating

resources for teachers through research, teachers in the field should be included to increase the reliability of these methods and resources. When researching the phenomenon further and developing methods, including teachers in the process may be key when taking steps to support students learning, wellbeing and school satisfaction. The overall benefit for all individual students in all spectrums of quality of life is ultimately the priority.

5.3 Further research

As mentioned throughout the discussion section, a call for further research on the topic of physically active learning is necessary for the best results in the implementation by teachers for student learning, student wellbeing and for teacher competency. Based on the perceptions of the teachers in this study, research based on student memory, concentration and behavior results of the different methods in use and especially how the results of various methods differ. With the support of teachers, development of a descriptive and research-based implementation guide for teachers and educators would support teachers with implementation, feeling more competent and reducing the amount of time and energy the methods require of the teachers. Following the interventions, research on how an implementation program works for all included in the process: school leaders, teachers, students as well as parents.

Based on the relation between the perceptions of teachers in this study and the theoretical background, the following includes a suggestion for an implementation guide in the form of a chart. This could be developed as a forum or method of sharing ideas and can be categories for increased accessibility. This also may provide teachers to find a method that is adaptable for the purpose they are searching for. The bolded titles separate the types of physical activity used during lessons into general physically active breaks that do not directly relate to curriculum learning goals and physically active learning methods that are based on curriculum learning goals. The categories could be designed as the following chart presents:

General physically active breaks	**Physically active learning methods**
Non-cognitively engaging physically active breaks -Divided into grade levels (1-3, 4-6, 7-9) -No subject division	*Curriculum based physically active breaks* -Divided into subject areas and grade levels (1-2, 3-4, 5-6, 7, 8, 9) (Mother tongue, Foreign languages, History, Science, Math, Religion, etc.)

	-Introduce new subject matter or review previously learned
Cognitively engaging physically active breaks -Divide by what function it engages/activates (memory, inhibition, shifting, logic) -Divided into grade levels (1-3, 4-6, 7-9) -No subject division	*Physically active learning lessons* -Divided into subject areas and grade levels (1-2, 3-4, 5-6, 7, 8, 9) (Mother tongue, Foreign languages, History, Science, Math, Religion, etc.) -Introduce new subject matter or review previously learned

This chart is just a draft to illustrate the suggestion for further research and development to take a step towards a more concrete and accessible form to improve the implementation of physically active learning during lessons. The chart is a step towards including teachers' perceptions in developing research based physically active learning methods. In order to provide the desired support for student wellbeing and learning, the support and material for teachers is a crucial step to take for sustainability.

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Appendix 1: Participant consent form

RESEARCH PERMISSION FORM

Date 20.3.2018

The research permission concerns documentation through recording of the Physically Active Learning in-service training session for teachers from Finland, Denmark and Lithuania. The research topic for the Master's Thesis is classroom teachers and subject teachers experiences on physically active learning teaching methods and decreasing student sitting time. The recorded material will be used to support the research. The material will be handled with strict confidentiality, and participants identity information will not be in any way used in the thesis report.

Participation in this research provides valuable information for the development of physically active learning in terms of teaching methods and supporting school wide physical activeness.

Research Permission

Collected data can be used for Master's Thesis (Pro Gradu) research purposes.

Date Location Signature

_____ _____ _____

Clarification on Signature_____

Master Thesis (Pro-Gradu)
Graduate Student
Maria Wuollet
maria.wuollet@student.oulu.fi
0449714889

Appendix 2: List of Participants

Participant	Country	Subject(s)
A	Denmark	Danish (Mother tongue), History, Religion
B	Lithuania	Math
C	Finland	English, Swedish
D	Denmark	Science
E	Lithuania	English
F	Finland	Finnish (Mother tongue)

Appendix 3: Focus Group Discussion Questions

Discuss Following questions in groups of three:

As a teacher, what experiences do you have with the use of physically active learning?

How might a physically active lessons affect student's concentration?

What are your thoughts on the idea of *cognitively engaging* physically active learning?

What would you like to know more about *cognitively engaging* physically active learning?